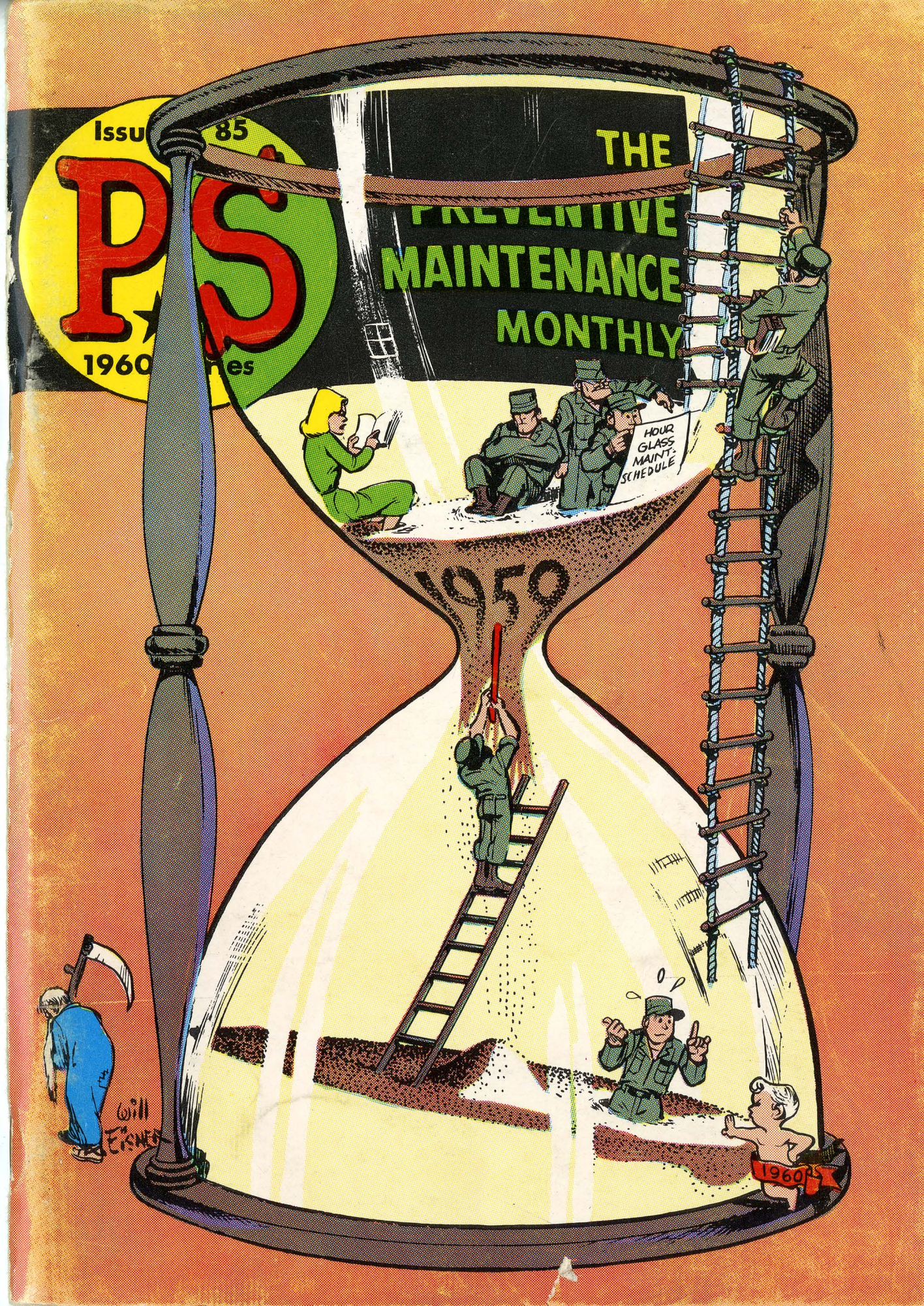
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MAINTENANCE
MONTHLY
HOUR GLASS MAINT. SCHEDULE
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Will Eisner

You've got equipment to maintain and you've got problems . . . right?

You're short on time, help, tools, parts, publications?

It looks like everything gets in the way of keeping your equipment maintained and ready for combat?

You've tried to solve your problems, but just can't seem to make any headway?

Then, there's one man you've got to give the word to or you're not with it. Tell him—your immediate superior, whether he's your squad, section or platoon leader, or maybe he's your Commanding Officer.

That's right. He's the man who'll listen closest when you're stumped on getting maintenance done.

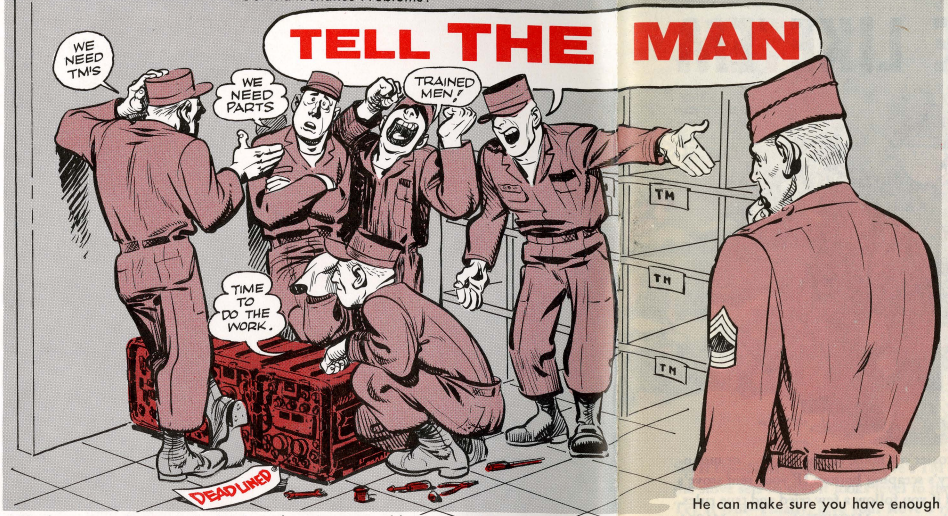
Why? Because without good maintenance, it's **his** outfit and **his** equipment that won't fight comes the showdown.

Also, AR 750-5 lays it right on the line . . . says he's responsible for keeping his unit's equipment combat-ready.

So, tell **The Man** your problems.

Got Maintenance Problems?

TELL THE MAN



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He can give that extra push when there's a snag in getting tools, parts and pubs.

So, there's no point in butting your head against the wall when you're stumped in maintenance.

Tell **The Man.** He'll go to bat for you 100 per cent.

PS THE PREVENTIVE MAINTENANCE MONTHLY

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SOME LIKE 'EM

Be it ever so humble there's no place cozier'n a home on the range... or mountaintop... or snowfield, when the mercury's scraping bottom **IF** your tent stove's giving out like it should. And like it will if you follow a few tried and true rules.

Doesn't matter what kind of stove you've got, an M1950 Yukon or an M1941 Tent Stove or a Herman-Nelson 250,000-BTU job or the like for big deals—or in a real pinch even an M1950 cooking stove or an Immersion heater. Every last one of 'em needs everloving care to keep purring.

WHEN YOU GET IT

First thing you do when you get that new or used stove is to see that all the parts, tools and accessories are there... and in working order. In other words:

Inspect It—Check your TM's and SM's for the parts, tools and accessories your stove should have. If you find any minor deficiencies that you can fix yourself or have fixed in your own outfit, hop to it. If you can't fix 'em, report 'em right away.

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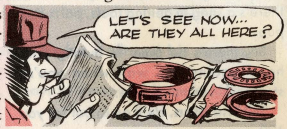

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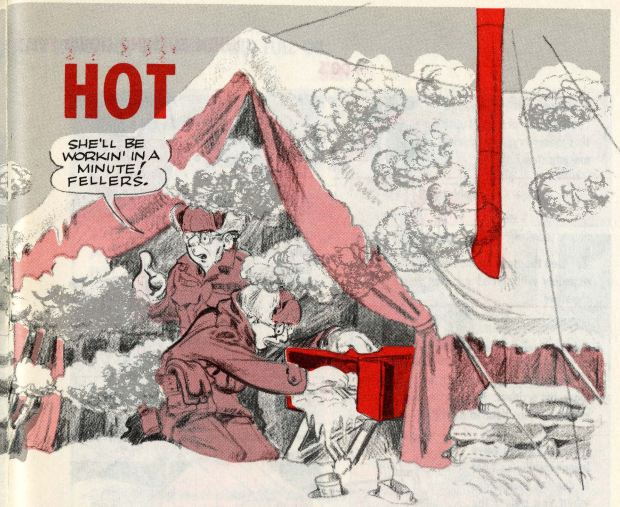

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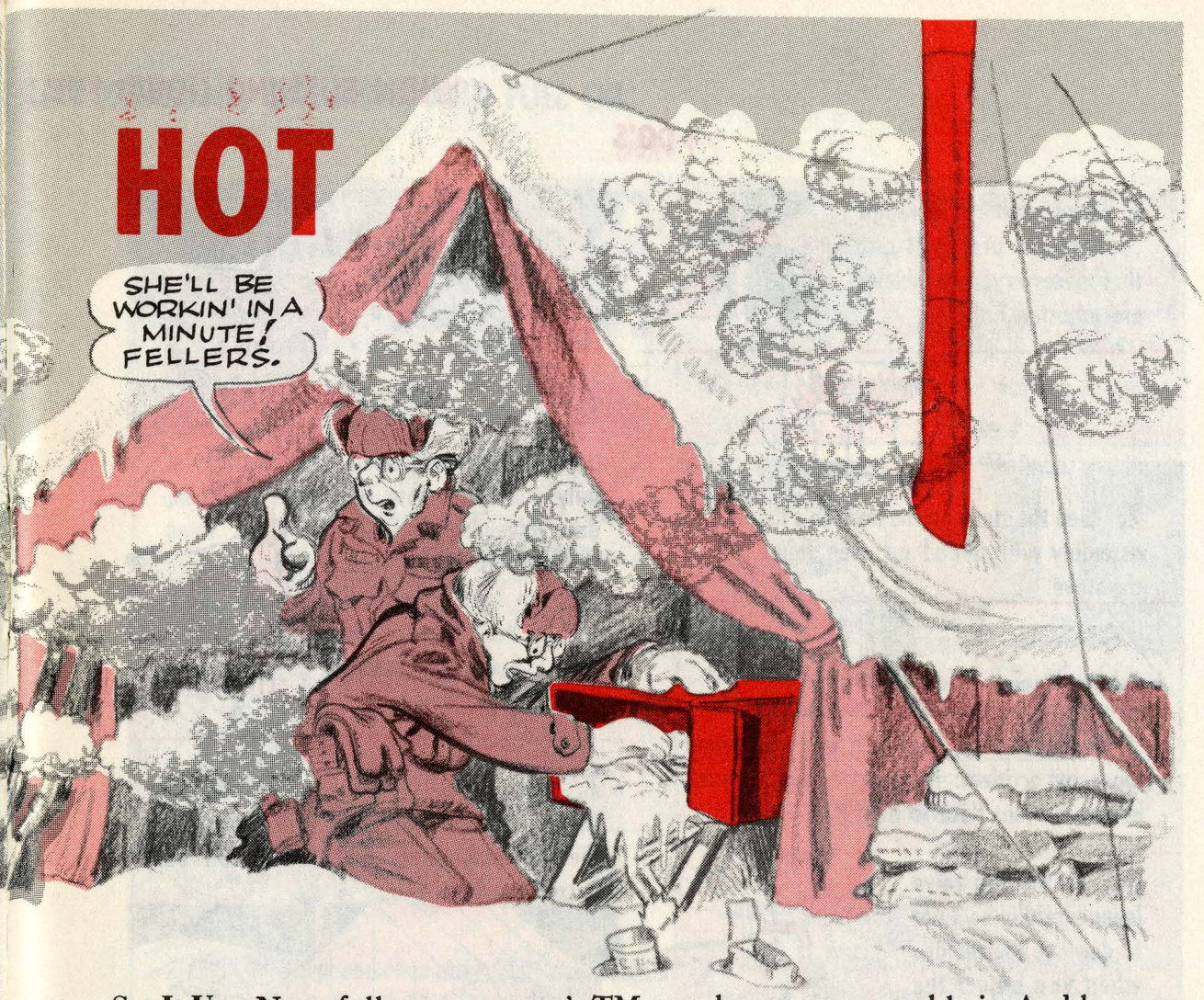

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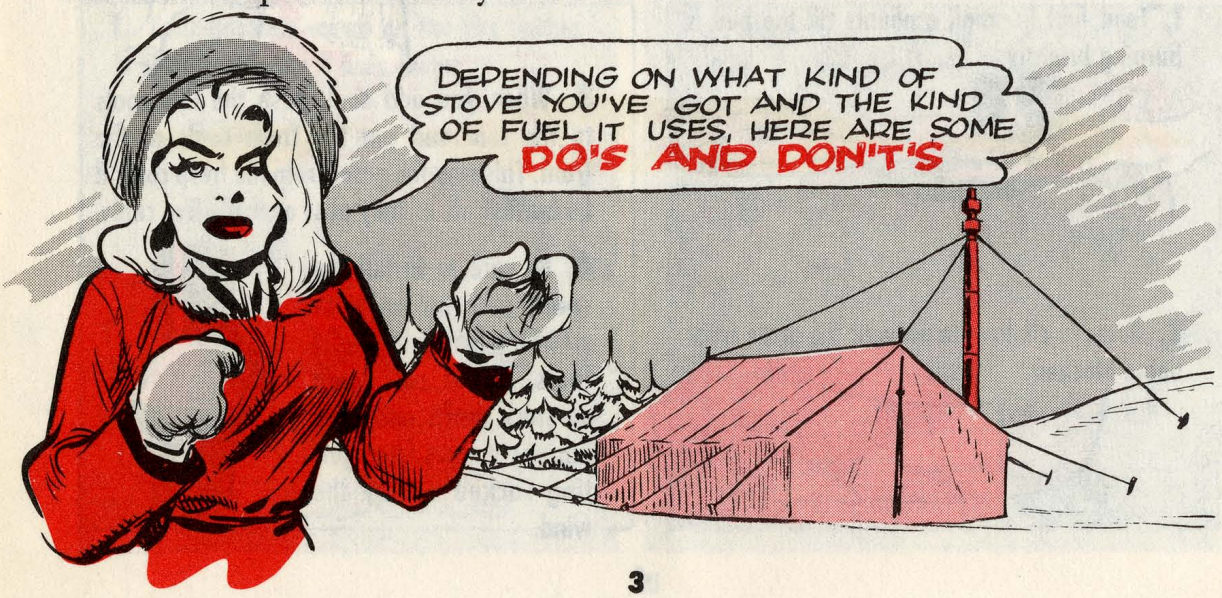
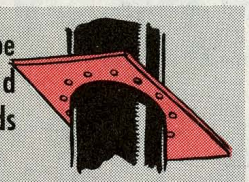
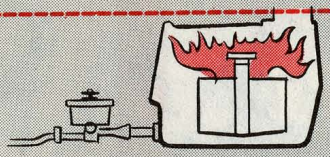


WHEN BURNING LIQUID FUELS

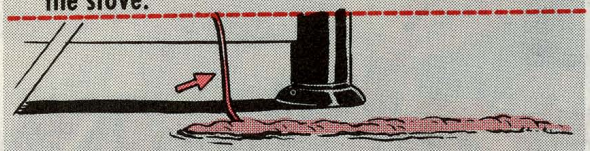
DO'S

1. Make sure all stovepipe connections are tight and that necessary tent shields are adjusted right.



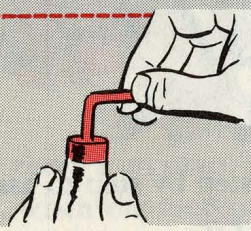


2. Keep the stove on the level so's the burner assembly will spread an even flame within the stove.

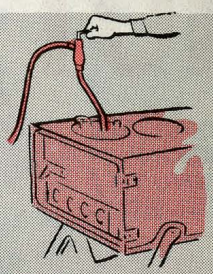


3. Protect the fuel hose so it won't be pulled loose by accident. If need be, dig a trench across the tent floor to hold it.

4. Turn the drip valve lever carefully so's not to damage the threads when you adjust the fuel flow.

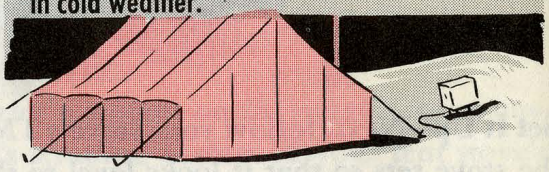


5. Check the fuel rate regularly. Adjust as needed to keep a steady flame.



6. If the flame accidentally goes out, close the drip valve pronto. When the stove's cooled off, wipe up any excess fuel inside the stove. Then wait 2-3 minutes before relighting it.

7. Keep all fuel supplies outside the tent. Fuels used in combat areas will probably be the low-temperature type that'll flow easy in cold weather.



WHEN BURNING SOLID

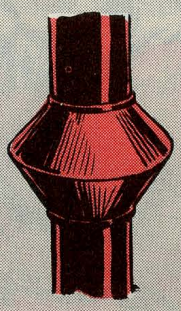
DO'S

1. Feed fuel in small amounts till the bed is burning brightly.

2. Remove clinkers to prevent the grate from being blocked.

3. When you add coal, push the live coals to the rear and put the fresh coals at the front. This way the gases from the fresh coals'll be burned off as they pass over the live coals.

4. Be sure to install the spark arrester on your M1941 when using solid fuels. This'll cut down on stack drafts and keep burning embers from getting sucked out by the wind.



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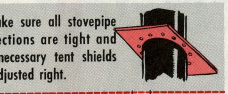
DO'S

1. Make sure all stovepipe connections are tight and that necessary tent shields are adjusted right.



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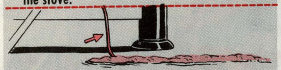

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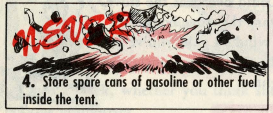
7. Keep all fuel supplies outside the tent. Fuels used in combat areas will probably be the low-temperature type that'll flow easy in cold weather.

DON'T'S

1. Let the fuel hose touch a hot stove.

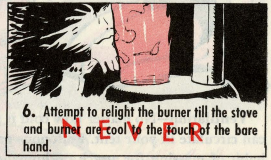
2. Force the drip valve past the closing point.

3. Leave the stove untended. As the fuel level goes down, the drip valve'll need adjusting to keep a steady flame.

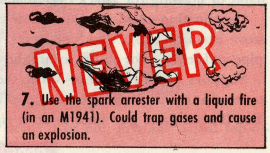


4. Store spare cans of gasoline or other fuel inside the tent.

5. Keep your mug near the door when lighting up.



6. Attempt to relight the burner till the stove and burner are cool to the touch of the bare hand.



7. Use the spark arrester with a liquid fire (in an M1941). Could trap gases and cause an explosion.

WHEN BURNING SOLID FUELS (COAL OR WOOD)

DO'S

1. Feed fuel in small amounts till the bed is burning brightly.

2. Remove clinkers to prevent the grate from being blocked.

3. When you add coal, push the live coals to the rear and put the fresh coals at the front. This way the gases from the fresh coals'll be burned off as they pass over the live coals.

4. Be sure to install the spark arrester on your M1941 when using solid fuels. This'll cut down on stack drafts and keep burning embers from getting sucked out by the wind.

DON'T'S

1. Pour gasoline or oil on the fire, either to start it or make it burn faster.

2. Let ashes accumulate below the grate. Hot ashes'll warp or melt the grate.

(LIKE KEROSENE, GASOLINE, AND FUEL OIL)

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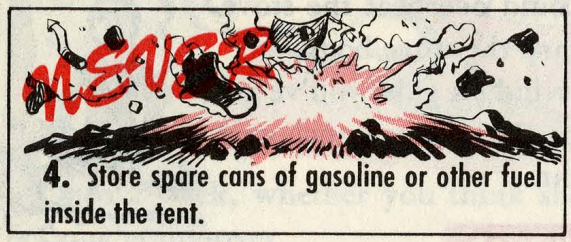

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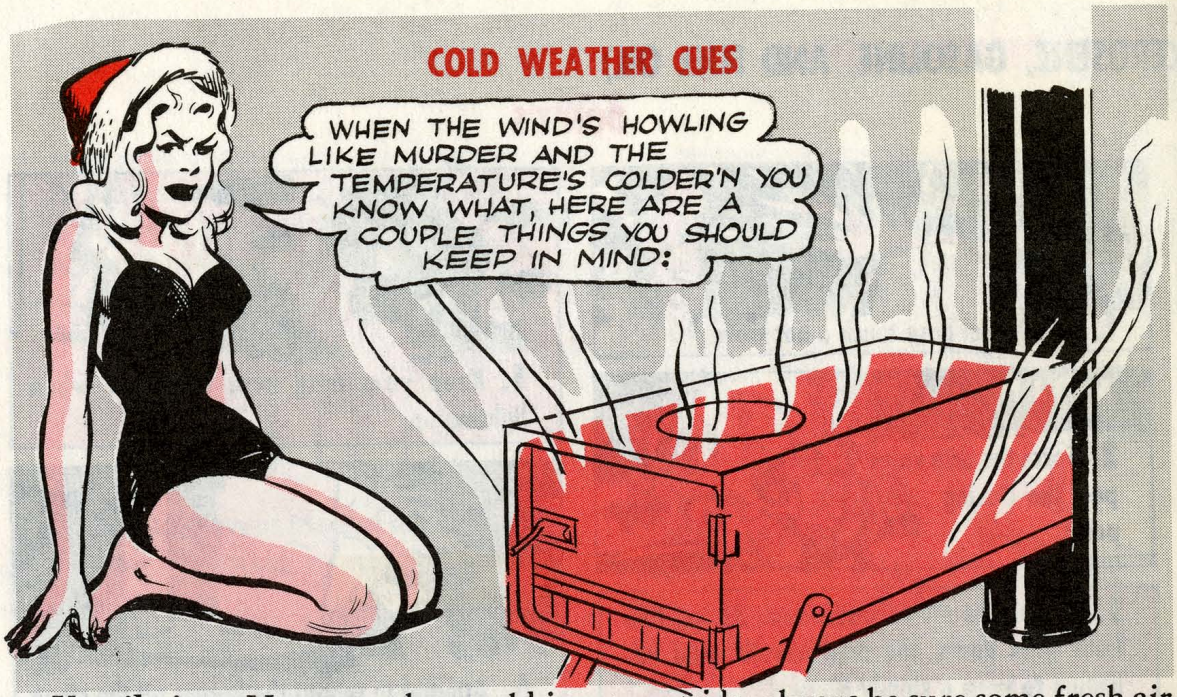
COLD WEATHER CUES

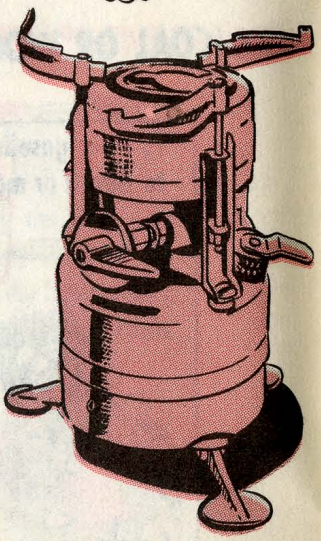


Ventilation—No matter how cold it gets outside, always be sure some fresh air can circulate in your tent. Poisonous gases from partly-burned fuel have a nasty habit of massing for attack on humans.

Overheating—And no matter how cold it gets, never let your stove run full blast. Very important. Could overheat the stove-pipe and set the tent on fire, or might warp the stove body.

Support And Protection—When the wind's a gale, you've got to see that the draft diverter on top of the stack is well anchored. You'll need three guy lines to do it right.

ODDS 'N' ENDS

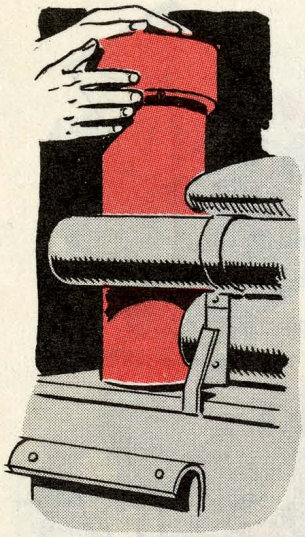


Some stoves need special care...like the M1950 one-burner, for instance. Never fill the tank of these one-burner's more'n ¾ full 'cause excess fuel under pressure will make the flame flare up when lighted.

Another thing, in extremely cold weather y'might have to pre-heat the one-burner twice in quick order to get it started right. It may also be necessary to pump a few extra strokes off and on to maintain operating pressure in the tank.

But in the mountains it'll be just the opposite. Gasoline va-porizes faster at higher altitudes and if you pump more pressure than's needed you might flood the burner or make the flame too high. Could be bad all around.

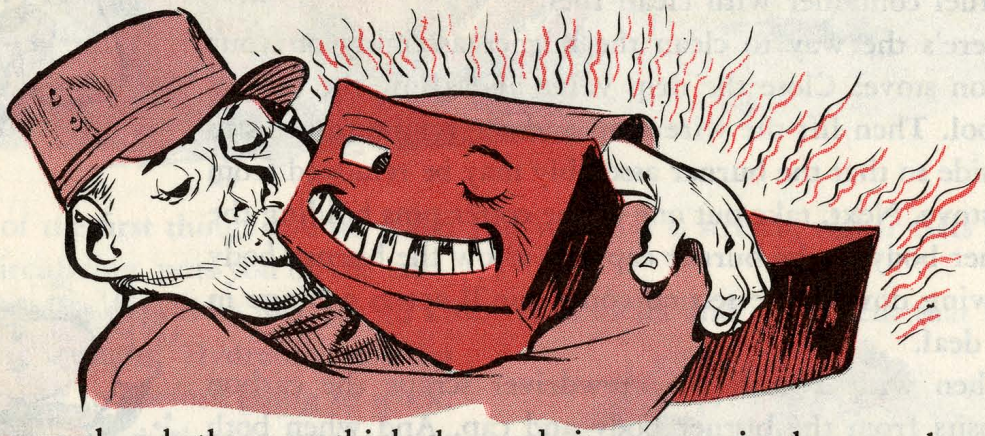
You've got to shield the cooking stove from strong winds, too, 'cause high winds could put out the flame or keep it from doing a good job.



If you're the keeper of a Herman-Nelson 250,000-BTU tent heater, you'd best be on the lookout for a couple things in extra-cold weather. Like for instance, ice forming in the exhaust stack.

What happens is this: Engine exhaust gases escaping through the economizer header, columns and collector contain some moisture which tends to collect and freeze in the stack. Also, always put a cap on top of the exhaust stack to keep ice and snow from collecting on the arrester screen when the heater is shut down.

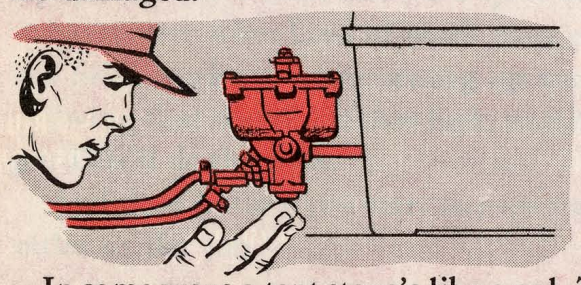
KEEP 'ER HAPPY AND SHE'LL...



Once a week, whether you think she needs it or not, give her a real top-to-bottom going-over.

Fix any defects you find right off—or have somebody else fix 'em. Apply medium oil to the stove body and to all parts showing signs of rust—'specially the spark arrester and/or the draft diverter.

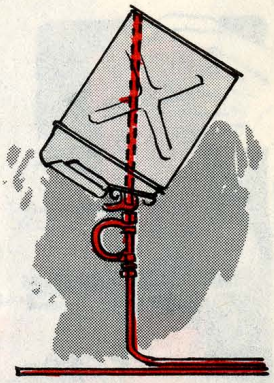
Remove the stovepipe. Take the sections apart, clean 'em good and then put 'em together again. Make sure all the sections are tight. Replace any that are damaged.



With the liquid burner: Operate the adjustment and shutoff knobs to see that they turn properly. Inspect the float valve to see that it's securely mounted and properly connected and that the controls are not damaged.

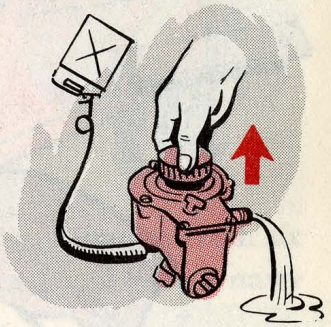
In some ways a tent stove's like a gal. Treat 'er right and she'll do right by you. Neglect 'er and watch out.

Check the fuel container and fuel lines for leaks. Keep the small holes in the burner pot free from carbon, soot and rust by cleaning 'em with a matchstick or wooden peg. But be careful not to enlarge the holes.

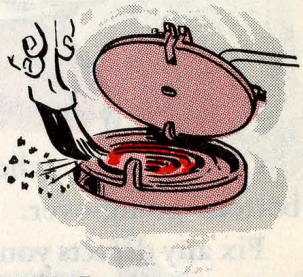


The bottom of the pot should be kept reasonably clean, but don't scrape it. A thin layer of carbon protects the metal and aids in starting a fire.

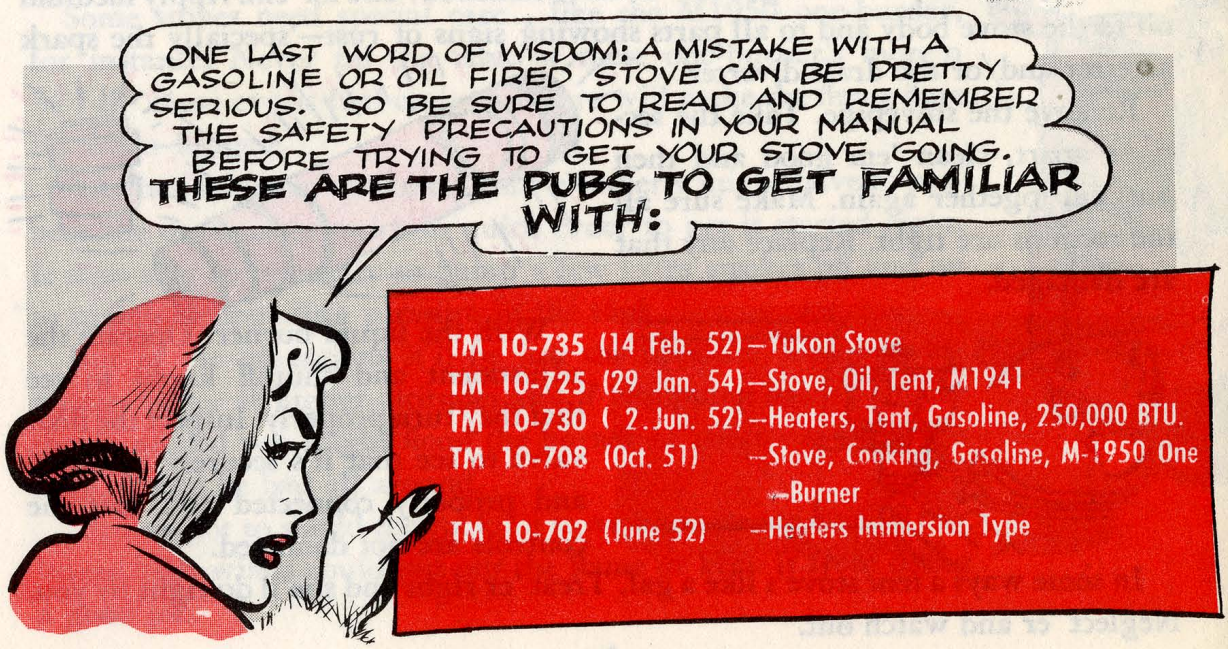
The float valve strainer—the whole valve, in fact—should be removed from the stove and cleaned with gasoline OUTSIDE the tent. Here's the way to do it: Disconnect the valve from the burner and connect it to the fuel tank. Then lift the flow adjustment knob and let the gas flow through the valve body. After it's all nice and clean, refill the fuel container with clean fuel.



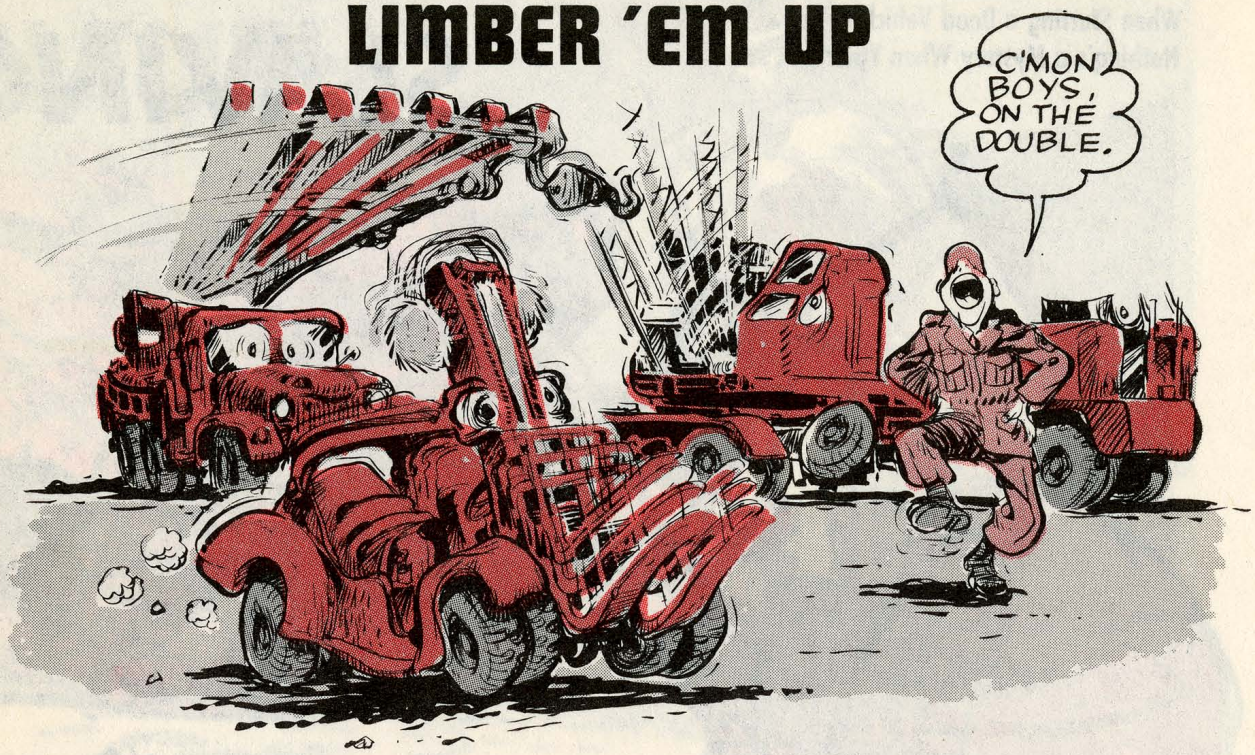
Here's the way to clean the burner assembly on your Yukon stove: Close the drip valve and allow the burner to cool. Then lift the wire loop and the retaining arms to the side so that the burner assembly may be removed from the stove. Next, take out one of the cotter pins holding the burner body to the burner cap and allow the burner body to swing down. The second cotter pin'll act as a hinge in this deal.



Then with a knife or screwdriver scrape the carbon deposits from the burner body and cap. And when both surfaces are clean, reassemble the burner and replace it in the stove body.

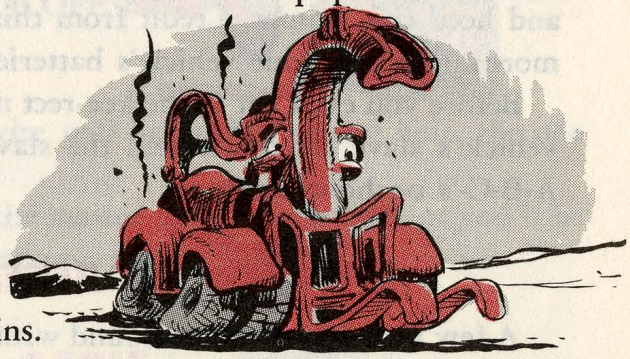


LIMBER 'EM UP



One of the first things you do when you wake up is stretch, right? Gets your blood circulating, puts you on the ball. . . .

Same thing should be true for all kinds of vehicles and equipment that have hydraulic systems. Hydraulic muscles need flexing too before going to work.



This goes double for equipment that's exposed to freezing weather. Cold weather makes the oil sluggish, ices up condensation in the oil lines, etc. —all of which add up to a charley horse that needs loosening up before work begins.

Same's true for vehicles that don't get full-range exercise of their hydraulic muscles during a regular day's work. You know, lifting just so high, booming just so wide or tilting just so far—as a particular job calls for. And, of course, any equipment that's been idle for a spell needs a little warm-up exercise.

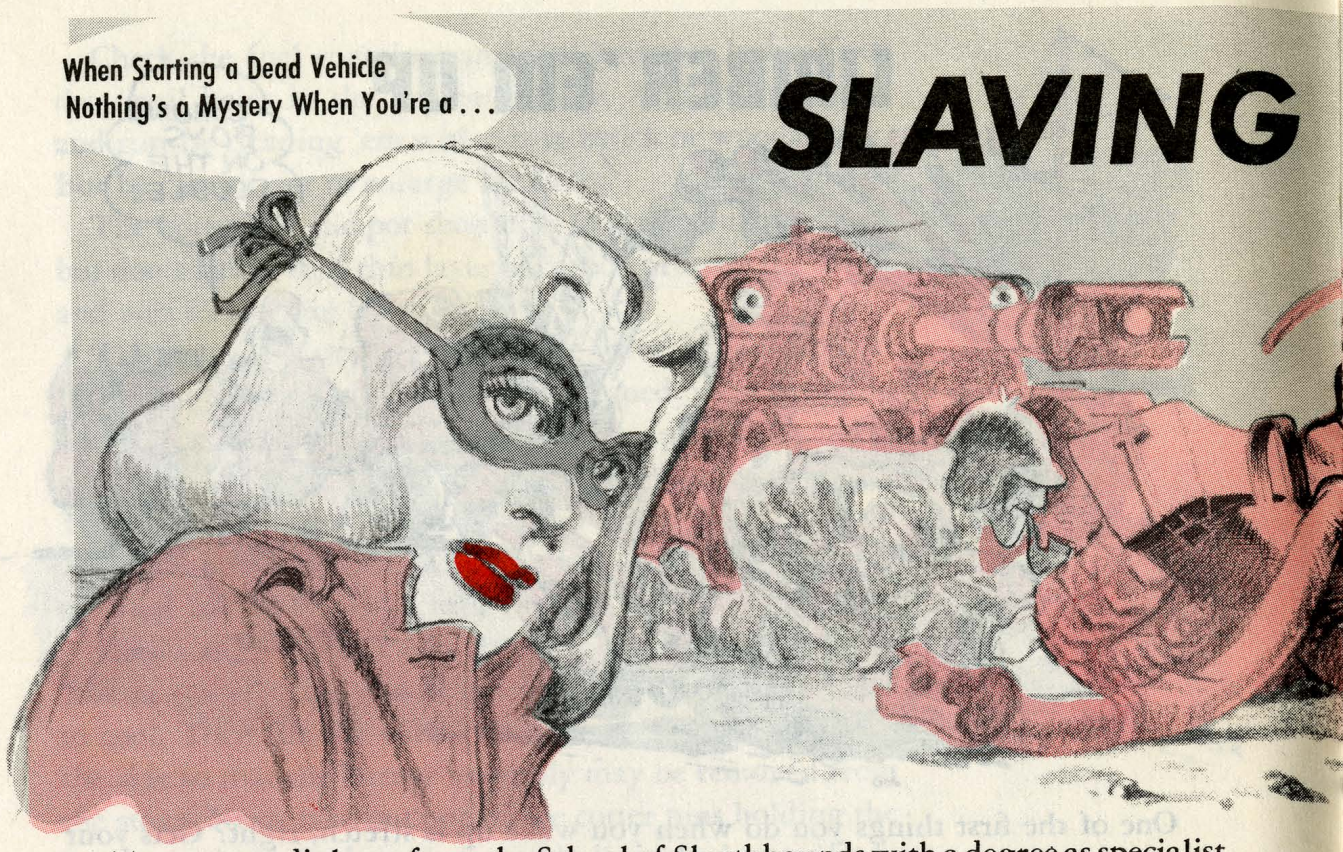
No matter what kind of work your equipment's doing, make it a habit to give it a brief workout—some setting up exercises—first time out each day.

Swing that boom, lift that fork, or tilt that mast a couple times as far as they'll go. This'll do the trick.

And do it **before** you start out—not after the equipments been moved out ten miles to the job.

When Starting a Dead Vehicle
Nothing's a Mystery When You're a . . .

SLAVING



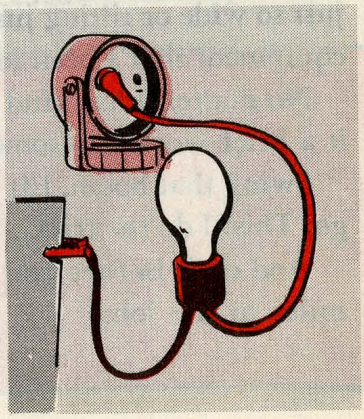
To get your diploma from the School of Sleuthhounds with a degree as specialist in Slaving Secrets, Polarized Poop or Summa Cum Cable all you gotta do is read and heed this primer. Credit from this school will come in handy on freezing mornings when your vehicle's batteries are too low to turn over the engine.

Before you even get to the kee-rect method for slaving, you oughta check your vehicle's slave receptacle and the slave cable you're going to use. Here're the A-B-C-'s on how it's done:

RECEPTACLE

A few vehicles have been found with their slave receptacles wired wrong—that is the negative wire hooked up to the positive hole in the receptacle and vice-versa. That can lead to a wicked charge... of murder for your vehicle's electrical system.

A quick way to check out your receptacle is to use a test lamp. With the master relay switch ON, and the engine and Li'l Joe OFF, hook up one wire to the receptacle's positive hole and ground the other wire to the vehicle. If it lights your lamp, then you know the positive (+) hole is hot like it should be. If it doesn't light your test lamp, the receptacle is installed wrong. To check out the receptacle further, try the negative socket to the ground. If this lights your lamp, that confirms that the receptacle is hooked up wrong.



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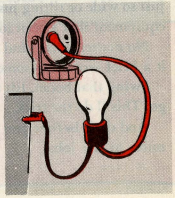
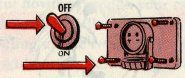


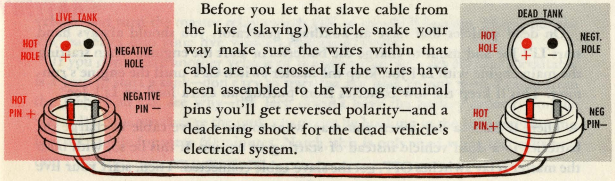
To right the wrong:



1. Make sure the master relay switch is OFF.
2. Take out the attaching cap screws.
3. Tear down the receptacle.
4. Switch the leads so that the hot wire will be in the positive hole, the one marked +.

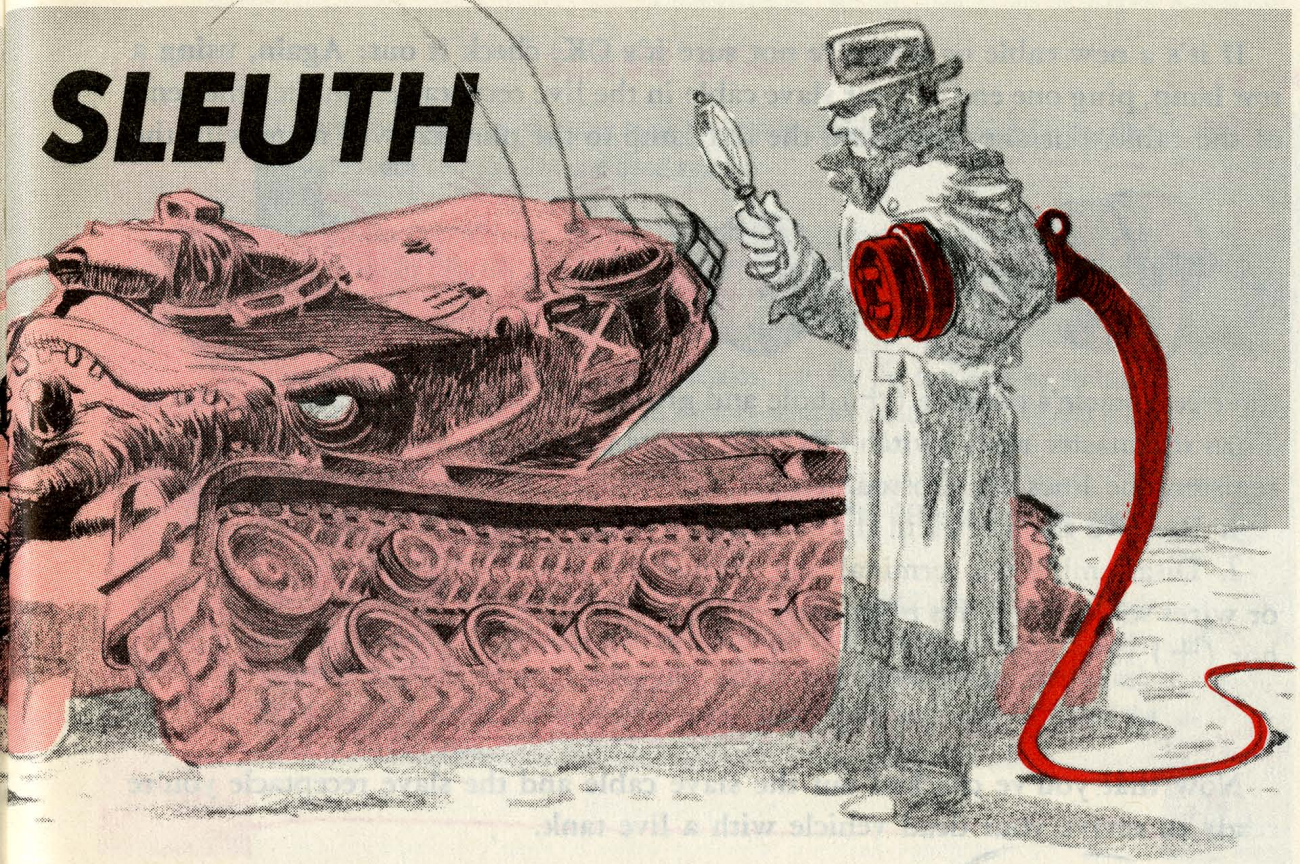
Remember, when you do this keep the master relay switch OFF, or you'll be working with a hot wire. A 24-volt arc can give a nasty burn.

SLAVE CABLE



Before you let that slave cable from the live (slaving) vehicle snake your way make sure the wires within that cable are not crossed. If the wires have been assembled to the wrong terminal pins you'll get reversed polarity—and a deadening shock for the dead vehicle's electrical system.

SLEUTH



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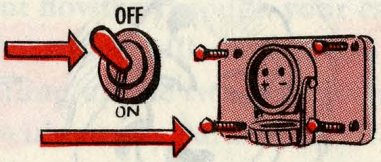

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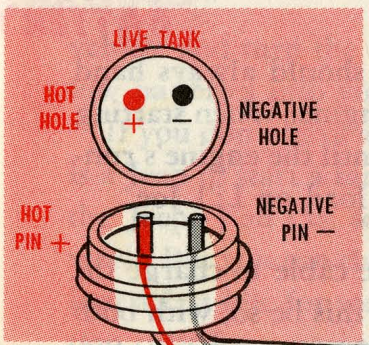

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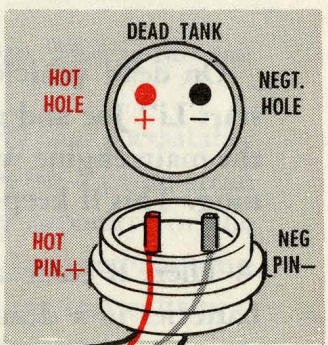
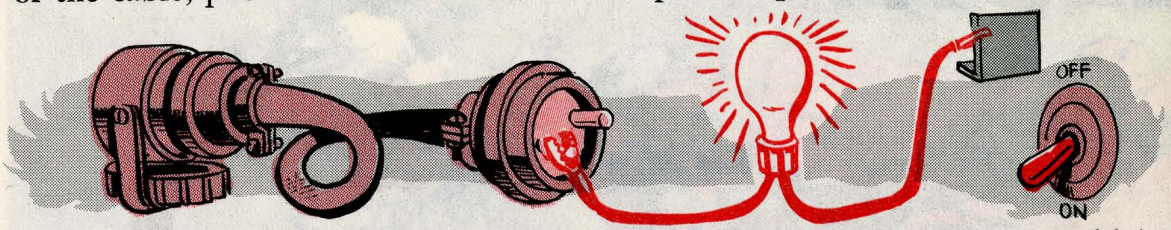
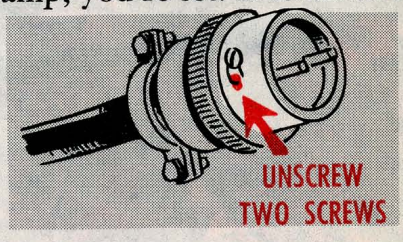


If it's a new cable or if you're not sure it's OK, check it out: Again, using a test lamp, plug one end of your slave cable in the live receptacle. On the other end of the cable, put one wire from the test lamp to the pin that will mate with the



slave receptacle's positive (+) hole and ground the other wire to the live vehicle. Turn the master relay switch ON. If it lights your lamp, you're set. If it doesn't register, the lines are crossed. To get 'em straight:

1. Remove the screws in the slave cable head.
2. Disassemble the terminal and change the pins or wires so the hot pin is positioned to mate with the hot (+) receptacle hole.



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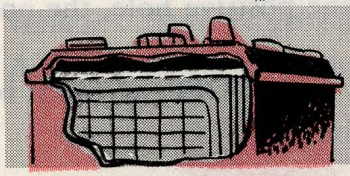
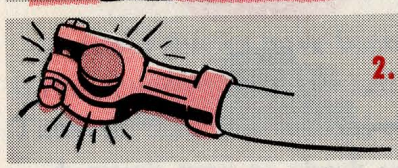
Now that you've checked out the slave cable and the slave receptacle you're ready to revive your dead vehicle with a live tank.



1. See that the water level in the batteries of the dead vehicle is above the plates.



2. That the battery cables and terminals are clean and tight.

BATTERY

On dead vehicles that have an auxiliary generator, you should always hand start Li'l Joe and use it to charge the batteries or start the engine. When starting the main engine with Li'l Joe, keep the master switch OFF until the engine's running. This'll keep the low batteries from putting an extra load on Li'l Joe.

There'll come a day when you may want to use a slave cable to charge the batteries in a dead vehicle instead of starting an engine. If this be so, with both the master relay switches OFF, get the slave cable connected. Then, start your live

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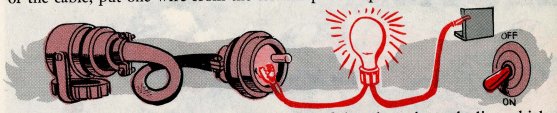

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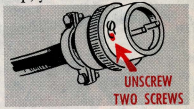

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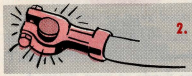

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SLAVE STARTING

LIVE VEHICLE — DEAD VEHICLE

O'course the first thing you want to do is get your vehicle close enough for the slave cable to reach both the live and dead vehicles.

Turn OFF the master relay switch in BOTH vehicles. Remember, in both vehicles the switch must be OFF, OFF and more OFF. This'll stop any arcing when you connect the slave cable.

After plugging in the cable into both vehicles, turn ON the master relay switch in the LIVE (slaving) vehicle and start its engine—set it for about 1400 RPM and bring the engine up to normal operating temperature.

In the dead (slave) vehicle keep the master relay switch OFF and start the engine in the normal way . . .

except the M42 Twin 40's. In the M42's the slave receptacle is installed so that an outside current cannot get to the starter unless the starter switch is closed . . . so when slaving this vehicle turn ON the master relay switch. But turn it OFF mucho pronto as soon as the engine starts and keep it off until the cable is disconnected.

Why be so careful? You don't want any current flowing through your cables when you're making or breaking connections—otherwise you'll damage the connections by arcing. And to avoid any danger of fouling up the two vehicles' electrical circuits by having two generators charging without any paralleling circuit.

So, when you have your slave tank running, turn off the engine and master relay switch in the slaving vehicle. Then, remove the slave cable from both tanks as quickly as possible.

Now at long last you can turn on the master relay switch in the slaved vehicle so the generator can start charging the batteries and bring 'em up to par.

vehicle and turn the master relay switch ON in the dead vehicle. This'll put the low batteries into your live vehicles charging circuit.

If you don't have another vehicle of the same size—let's say all that's available is a Jeep to start a tank—don't try to start the big tank engine with a cable from the Jeep. You can see why—the Jeep doesn't have the battery capacity for the work. But you can charge the tank's batteries by hooking in the Jeep and running it at a fast idle for some 60 minutes. Natch, this is only used when tactical situation calls for emergency measures.

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CHARGING

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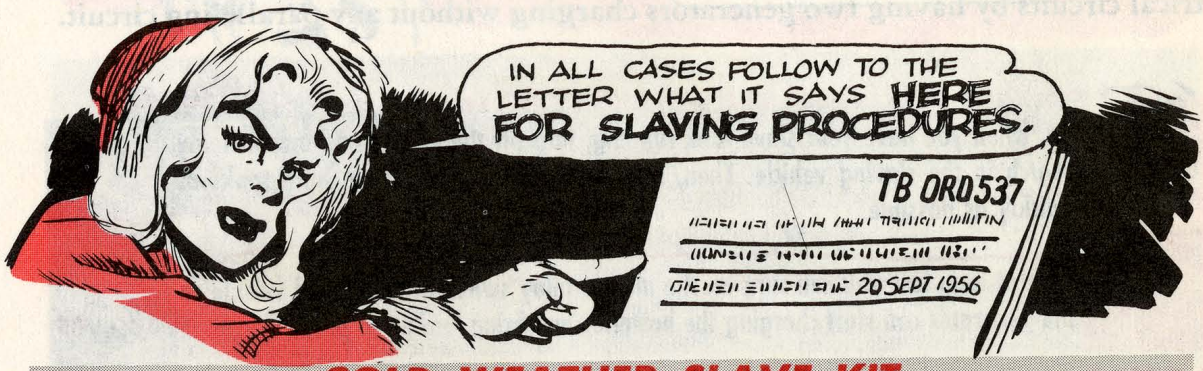
MORE POWER TO YOU

There's one more situation where you might want to use a slave cable. This is to supply current to run the electrical accessories in a vehicle which has no battery. There's no point here in turning on the master relay switch—except in the M42—'cause with no battery in the vehicle the positive cable may be lying in such a position that it can cause a flashing short.

MASS PRODUCTION SLAVING

In places where vehicles are stored and batteryless-like National Guard or Reserve units—it's easier to start up engines and exercise them by using the slave cable from another truck or from an extra set of batteries transported on a cart or truck. This eliminates the extra work of installing the vehicle's own batteries. Here again, always use a set of batteries that are at least similar to the batteries in the vehicle you're going to start.

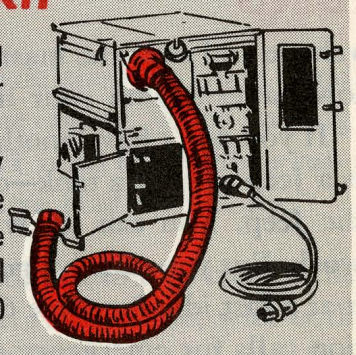
When using the batteries from a slaving vehicle don't forget to shut OFF the live truck's engine when the dead vehicle is able to run on its own—that is, if you keep the slave cable hooked up. You don't want two generating systems trying to charge the same batteries without a paralleling circuit.



COLD WEATHER SLAVE KIT

For you men stationed in long underwear country there's a cold-starting aid kit (slave kit) M40, FSN 2540-570-1354, to help you out with your starting problems.

This slave kit is a magic box that has an auxiliary source of electrical energy to start engines in temperatures as low as −70° F. In an emergency, the slave kit can be used to charge a vehicle's batteries with or without the slave receptacle. For the full dope you oughta look up TB Ord 390 (18 Jul 52) including Change 1 (20 Jan 54). To find out if your outfit rates an M40 slave kit, take a gander at SB 9-16 (21 Oct 54).



Connie Rodd's

"SHORT 'N SWEET DEPT"

Rope wick trick

Here's a rope trick that helps beat the fire hazard of having left-over gasoline in the tanks of engines, stoves, lanterns and the like that're in storage in your unit.

Take a piece of clean ½-in **cotton** rope (never hemp or material like that) and drop it into the tank so that it reaches bottom and contacts the remaining fuel. Make a knot in the rope at the filler neck (or other opening) to anchor it so it'll stick out.

The rope'll make like a wick and help the fuel out of the tank into the open where it'll evaporate fast. Be sure you have plenty ventilation.

It's a good way to get rid of the problems of fumes and flames, which could be real dangerous. And it sure throws the scent off the inspectors too.

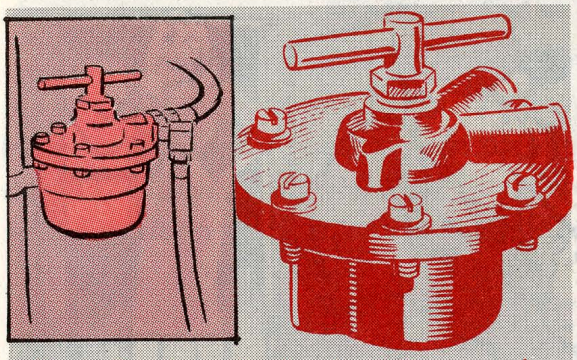
Top twister

Still straining oil in your Jeep engines with the Cuno-type filter? They're the ones that came with your M38's and early M38A1's.

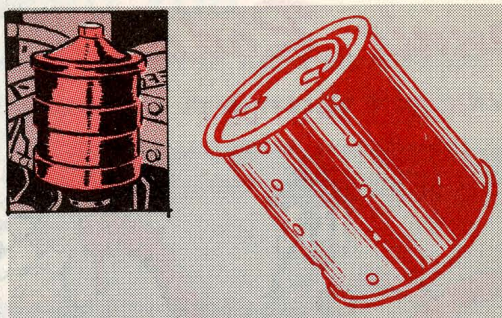
If your quarter-ton's still wearing this original equipment, you need to twist her top several times for each day's operation to keep that glop outa the oil. Four or five complete turns a day... not just one like a lotta people have been doing.

You'll find the poop on this in Change 3 (18 Jun 58) to TM 9-8012 for the M38. If you don't see it in TM 9-8014 for the M38A1, it's because most of the M38A1's have another type of filter . . . the military cartridge. It's got no handle at the top to be twisted.

The military cartridge is the preferred item for filtering oil, but as long as Cunos are serviceable, they're to be used until the stock's depleted.



If your Cuno's not cleaning the oil, it may need a new **head.**



On the other hand, the military cartridge type can be renewed just by slipping in a new filter **element.**

Lay a sharp eye on the FSN's in the Ord 7, though, when you're ordering new parts for these filters. Don't let the word "cartridge" throw you.

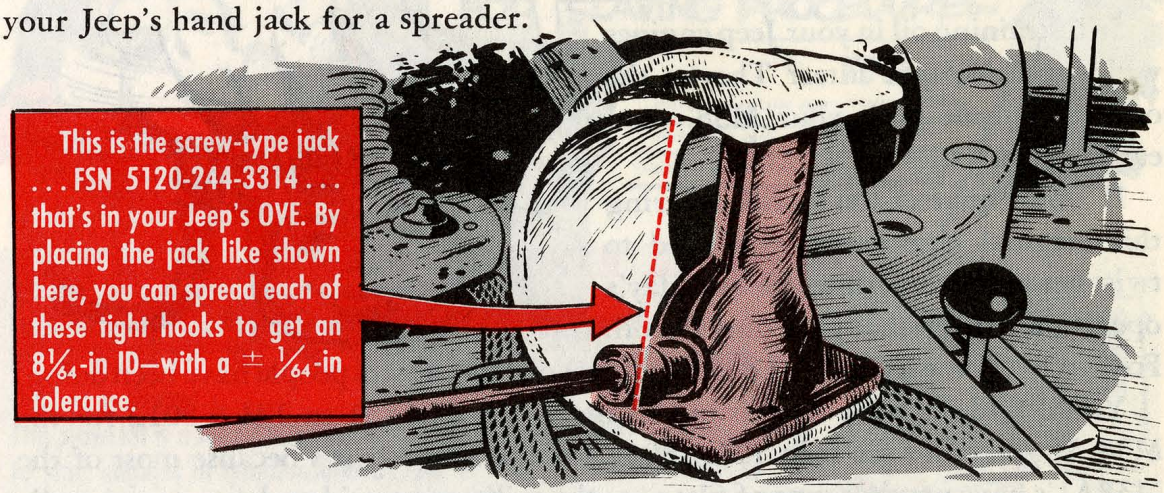
With Filter, oil, assy (Cuno)—FSN 2940-737-5060—your filtering unit is **Head,** w/cartridge, assy—FSN 2940-737-5058.

With Filter, oil, assy (cartridge type)—FSN 2940-202-9653—your filtering unit is **Element,** oil filter, w/gasket—FSN 2940-141-9025.

Like oil and water, these units don't mix. And if you change over to the military cartridge type filter, you'll need to take it up with your Ordnance support, 'cause you're gonna need different brackets to hold this new-type filter.

Spread 'em out

Some M55 SPH outfits been having trouble with ammo hoist hooks that won't fit around the projectiles. If you're in this spot, don't pull out your hair—grab your Jeep's hand jack for a spreader.



This is the screw-type jack . . . FSN 5120-244-3314 . . . that's in your Jeep's OVE. By placing the jack like shown here, you can spread each of these tight hooks to get an $8\frac{1}{64}$-in ID—with a $\pm \frac{1}{64}$-in tolerance.

But crank that jack handle slow and easy. Your hooks are made of low grade carbon steel that won't take kindly to any welds made necessary by careless hands. Besides, most of the hooks giving you this trouble probably won't have to be spread more than $\frac{1}{16}$ inch. You can leave the hooks right in place for this job.

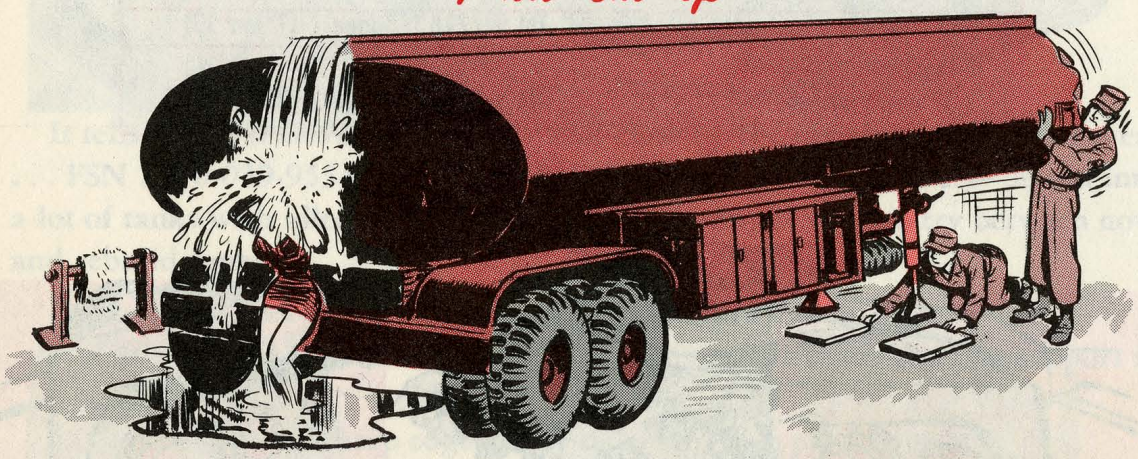
Slippin' and trippin'

Seems like the rear hull platform of the M44 SP howitzer and the ramps of the M59 APC and M84 SP mortar can get mighty slippery at times. Especially when the regular coat of non-skid paint gets worn and then is coated with mud, water or gook.

Here's something that'll solve this safety problem right quick. It's called Enamel walkway compound, non-slip, rough O.D., MIL-F-18176A. FSN 5610-171-4055 gets you a 1-gal can from the Engineers.

This paint will take about four hours to dry tack-free and should reach its full hardness in about 24 hours at a temperature of 70° F. You can spray, brush or trowel it on.

Pad 'em up



Whenever it comes to parking your M131A2, 5000-gal semi-trailer gas tankers, there's something you should do before you drop it from your tractor.

The two pads that go under your landing legs should be taken out of their stalls and placed under those legs. This is so the legs'll rest on a good solid base—'specially on soft or uneven ground.

There's another job, not so easily noticed, that those pads do for you when you place 'em under the legs. Water can collect on the top of your tankers, along the catwalk dam wall—the pads'll help raise the front end of the tanker and let a lot of the water run out the drain hole at the rear.

You want to get in the habit of using the pads and they'll be a big help keepin' that tanker in shape.

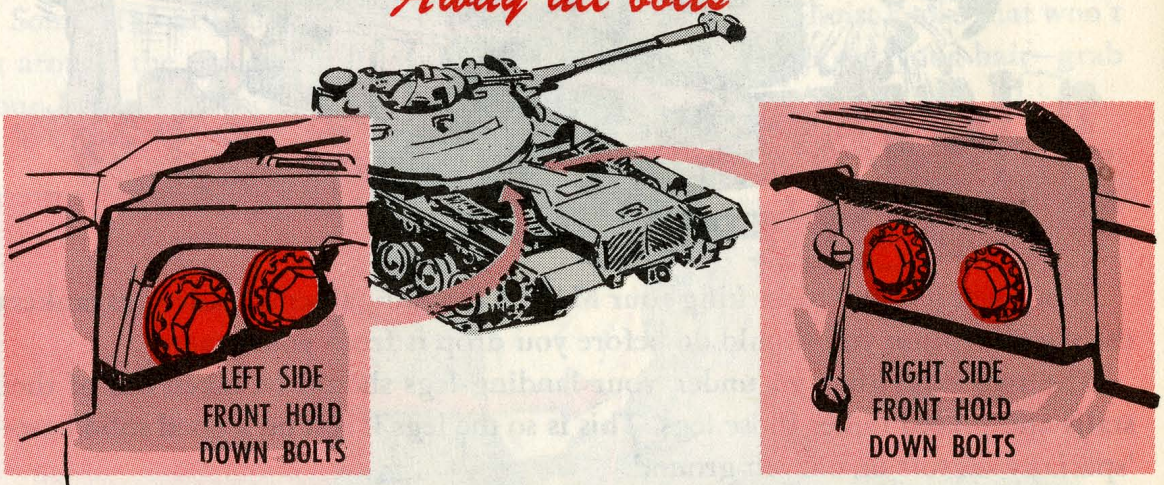
Your MAC here?

Maintenance allocation charts are now coming out almost as fast as sausages out of a meatgrinder. This is something you want to be on the lookout for—'cause these charts give you something to sink your teeth in as to what you're responsible for on your vehicle . . . and who does the other maintenance jobs.

So take a gander and see if these additions apply to you:

VEHICLE	MAINTENANCE ALLOCATION CHARTS
M52 105-mm SP howitzer	TM 9-7204/Change 1 (29 Dec 58)
M53 155-mm SP gun	TM 9-7212/Change 2 (29 Dec 58)
M42 twin 40s	TM 9-7218/Change 1 (7 Jan 59)
M44 155-mm SP howitzer	TM 9-7004/Change 1 (29 Dec 58)

Away all bolts



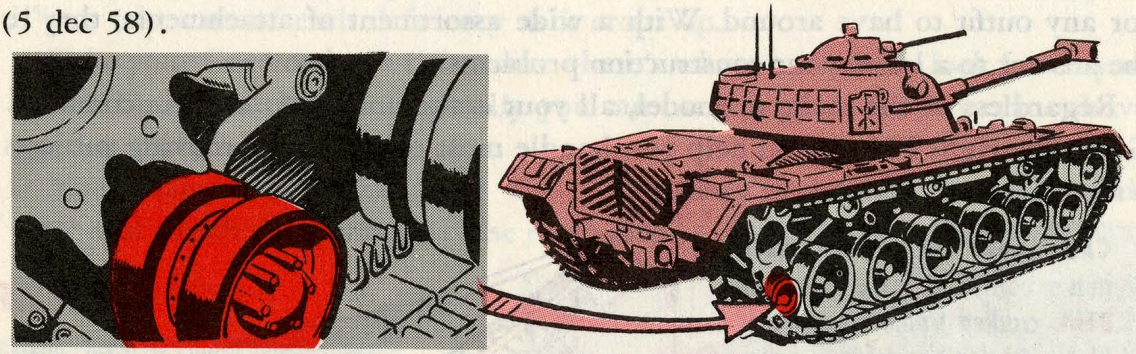
Before yanking that top-deck cover offa your M48-series medium tank with the M62 wrecker's crane . . . better make sure you take out **all** the hold-down bolts.

Some of your buddies are forgettin' to pull out the four front bolts at the turret line—two on the left and two on the right. They're easy to forget . . . 'cause you can't see these bolts without looking for them. If these bolts aren't out, they'll shear when the cover's lifted.

You oughta add a special check on the M48A2's . . . because some vehicles in this series have Li'l Joe mufflers attached to the underside of the top deck. It's just as much a goof move lifting the top-deck cover without loosening the auxiliary muffler clamps. The result is a messed-up muffler. But if your vehicle's got its auxiliary engine muffler attached to the fender you've got nothing to worry about on this score.

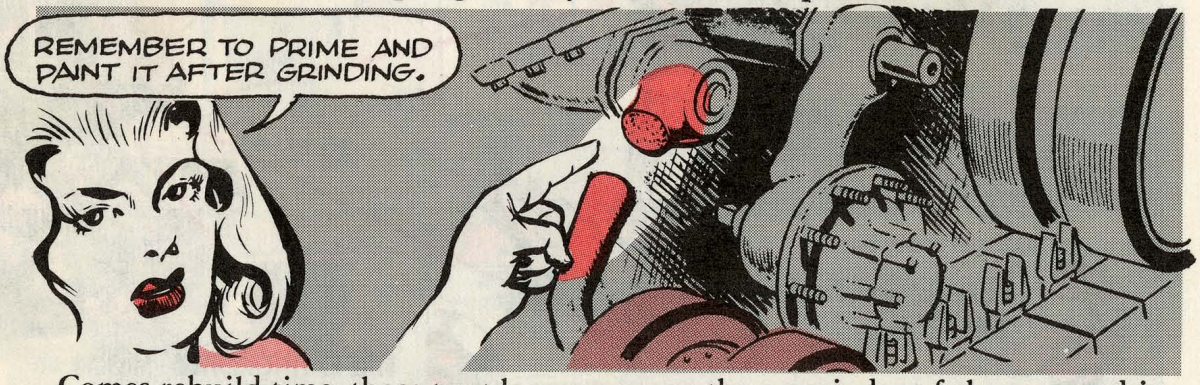
When idlers go idle

That's the time to get rid of them. Yessir! If your track tension idler wheel assembly kaputs on any of your M48-series tanks—check MWO 9-2300-202-20 (5 dec 58).



It tells you to remove the assembly and close up the openings with two covers . . . FSN 2530-039-9534. But if you have trouble getting the covers—or run into a lot of tanks with idler trouble—here's a fix you might want to try between now and rebuild time:

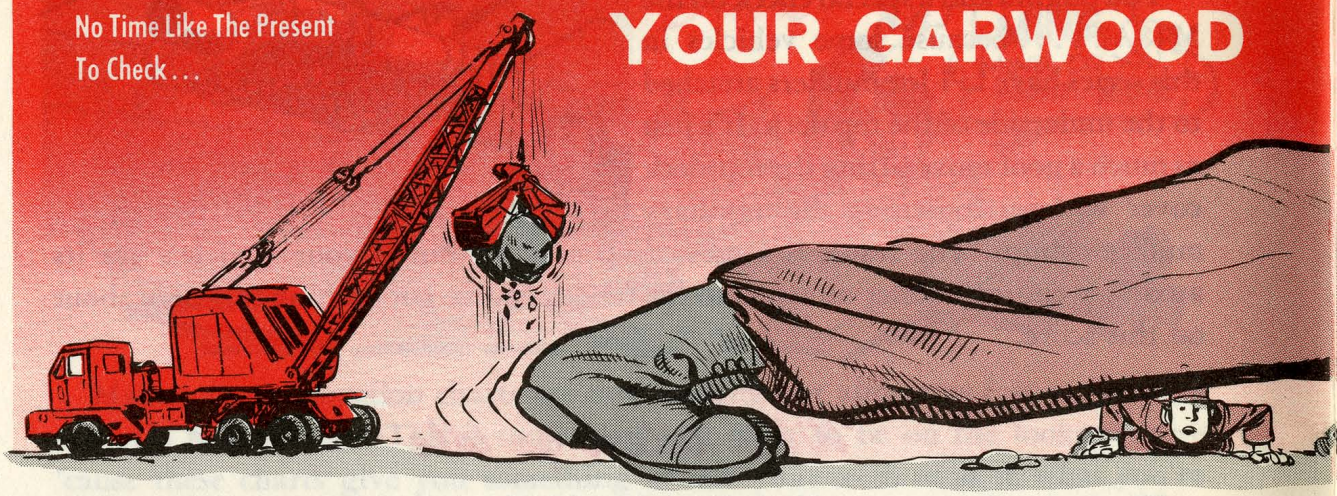
1. Cover the area around the idler assembly with asbestos.
2. Cut the idler arm off with your acetylene torch, leaving the arm support in place.
3. Grind down the sharp edge left by the torch, then paint over.



Comes rebuild time, those people can remove the remainder of the arm and its support—then close up the openings with those covers.

No Time Like The Present
To Check . . .

YOUR GARWOOD

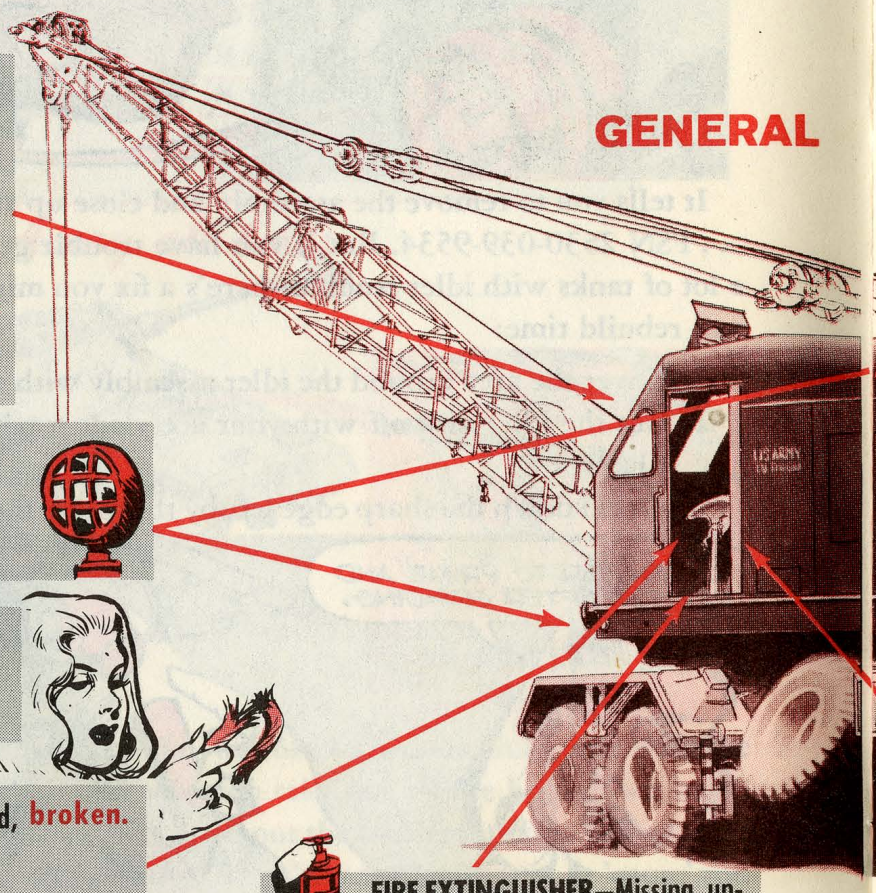


Your crane-shovel units—crawler or truck-mounted—can be pretty handy rigs for any outfit to have around. With a wide assortment of attachments, they're the answer to a lot of your construction problems.

Regardless of the make or model, all your crane units have a lot in common. Given the right PM, they'll help you handle most of your earthmoving projects with no sweat.

GENERAL

CAB—Loose, missing assembly nuts or bolts. (This could be major.) **Bent,** cracked frame members. If higher echelon has deferred maintenance and said it's safe to operate, then it's not a deficiency. Windows broken, missing. **Doors or panels missing; don't open, close or fasten.**



LIGHTS (Floodlights, Marker Lights, Dome Lights)—Lenses dirty, broken, missing. Reflectors discolored.

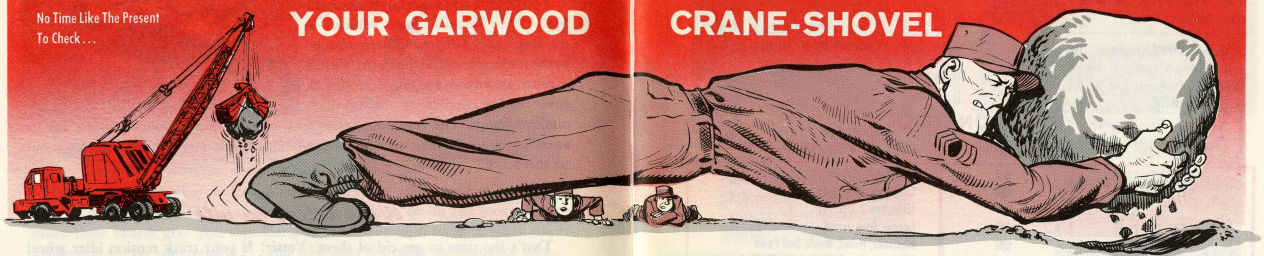
Wires—**broken, loose,** badly frayed. Lamps loose, burnt out. Mounting loose.

SEAT—Mount cracked, **broken.** Bolt missing.

FIRE EXTINGUISHER—Missing, unserviceable, not fully charged. Loosely mounted.

No Time Like The Present To Check...

YOUR GARWOOD CRANE-SHOVEL



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You can keep your rigs in top shape and, at the same time, make 'em gigproof if you take care of each deficiency as it crops up.

Take your Garwood as a f'rinstance—here's what you want to look for on your M20A(F) or your M20B. Generally you can use this guide for any crane-shovel for that matter.

Your major deficiencies are in heavy type. They're the ones that could make your unit unsafe to operate...cause extra wear...or lead to a breakdown.

GENERAL APPEARANCE

CAB—Loose, missing assembly nuts or bolts. (This could be major.) **Bent,** cracked frame members. If higher echelon has deferred maintenance and said it's safe to operate, then it's not a deficiency. Windows broken, missing. **Doors or panels missing; don't open, close or fasten.**

LIGHTS (Floodlights, Marker Lights, Dome Lights)—Lenses dirty, broken, missing. Reflectors discolored.

Wires—**broken, loose,** badly frayed. Lamps loose, burnt out. Mounting loose.

SEAT—Mount cracked, **broken.** Bolt missing.

FIRE EXTINGUISHER—Missing, unserviceable, not fully charged. Loosely mounted.

UNIT, USA MARKINGS—Missing, incorrect, not readable.

MACHINERY DECK—Oily, **excess dirt, Cluttered with containers, trash.**

LEAKS—Look for source of **grease, oil slicks on ground or machinery deck.**

FRAME, GUARD, OUTRIGGERS—**Bent, cracked, broken.** Outrigger pedestals mounted loosely. Screw jack not protected, bent, damaged muddy, dirty, rusty. Pin missing from jack screw cover.

ID, INSTRUCTION PLATES—Missing, not readable, loose.

CRANE-SHOVEL

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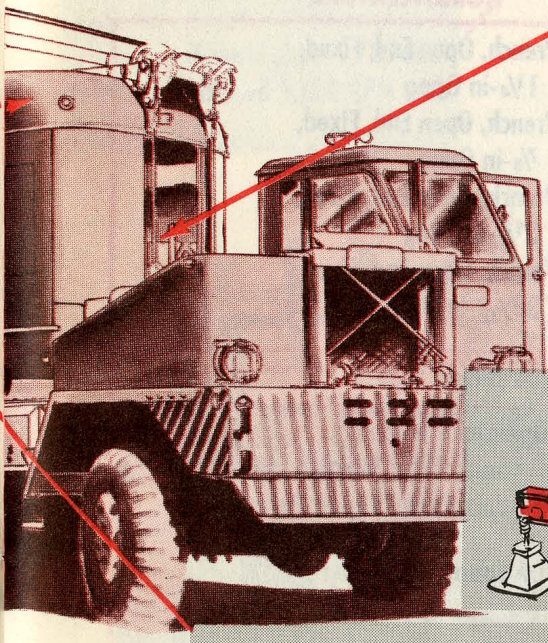
APPEARANCE

UNIT, USA MARKINGS—Missing, incorrect, not readable.



MACHINERY DECK—Oily, excess dirt, Cluttered with containers, trash.

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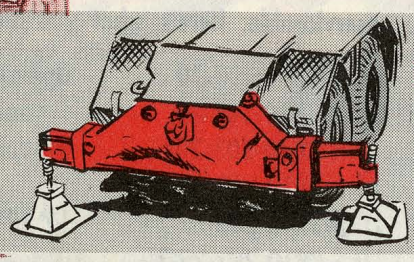
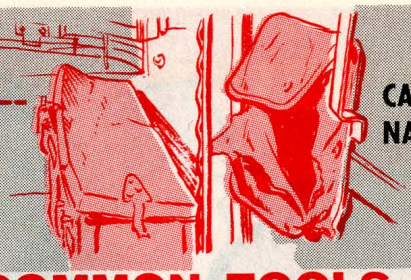


FRAME, GUARD, OUTRIGGERS—Bent, cracked, broken. Outrigger pedestals mounted loosely. Screw jack not protected, bent, damaged muddy, dirty, rusty. Pin missing from jack screw cover.

ID, INSTRUCTION PLATES—Missing, not readable, loose.

TOOL BOX—Rusty. Lid doesn't close, fasten or open.

TOOLS, EQUIPMENT—Unserviceable, missing. Not properly stowed. Here're the tools you rate for the M20A(F) or M20B:



CASE, OPERATIONS & MAINTENANCE PUBS—Missing. Ripped.

COMMON TOOLS

FSN	TECH SERVICE	NOMENCLATURE
5120-224-1372	QM	Bar, Pinch: 26-in
5120-224-1390	QM	Crow bar: 59-61-in (Effective 1 Oct 59)
4930-260-2801	QM	Grease Gun, Hand
5120-243-2963	QM	Hammer, Hand, Mach, Ball Peen
5120-293-0887	QM	Hammer, Hand Blacksmith, Sledge (Effective 1 Oct 59)
4930-169-8275	QM	Oiler, Hand
5120-293-1408	QM	Punch, Drive Pin
5120-223-7397	QM	Pliers, Slip Joint
5120-277-9491	QM	Screwdriver, Flat Tip
5120-293-1322	QM	Wrench, Box
5120-264-3796	QM	Wrench, Open End, Adjustable
5120-317-8178	QM	Wrench Set, Socket Head

SPECIAL TOOLS

FSN	TECH SERVICE	NOMENCLATURE
5120-595-9001	QM	Wrench, Open End, Fixed, 1 1/4-in Opng
5120-293-1352	QM	Wrench, Open End, Fixed, 7/8-in Opng
FSN Not Assigned Req Under 80226-11919	Eng	Wrench, Open End, Fixed, 2 1/2-in Opng
FSN Not Assigned Req Under 80226-11918	Eng	Wrench, Open End, Fixed, 3 5/32-in Opng

PUBLICATIONS—Missing, unserviceable. Here's what you should have:

MODIFICATION, GARWOOD M20B CRANE — MWO 5-3810-203-35/1 (1 Oct 58). MWO 5-9488-5, 27 Aug 57. MWO 5-9488-6, 10 Nov 58.

TM 5-3810-203-10	Operator's Manual
TM 5-3810-203-20	Organizational Maintenance Manual
TM 5-3810-203-20P	Organizational Repair Parts
LO 5-3810-203-20-1	DA Lubrication Order
LO 5-3810-203-20-2	
LO 5-3810-203-20-3	
LO 5-3810-203-20-4	

INSTRUMENT PANEL

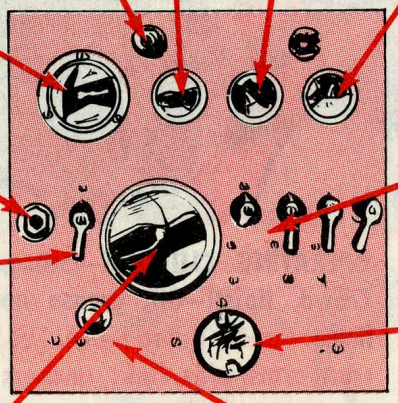
TEMPERATURE GAGE—Glass broken, missing. **Needle broken, missing.** Registers low or **fails to register.** Registers above 200°F. (Operating temperature should be between 160°F and 190°F.)

OIL PRESSURE GAGE—Glass broken, missing. **Needle broken, missing. Fails to register.** Registers below normal high. (Should read about 40 PSI operating speeds—can be as low as 15 PSI at idle.)

INSTRUMENT PANEL LIGHTS—Reflectors missing. Bulbs burnt out, missing. Wires broken, loose, frayed.

AMMETER—Glass broken, missing. **Needle broken, missing. Fails to register. Needle shows discharge when engine operating.** (Ammeter should show 2-3 amp charge with engine running. Can show high charge temporarily right after starting.)

HOURMETER—Glass broken, missing. Needle broken, missing. Fails to register minutes and hours when engine is operating.



STARTER BUTTON—**Broken,** loose connections, mounting.

LIGHT SWITCHES—**Broken,** loose. Connections loose.

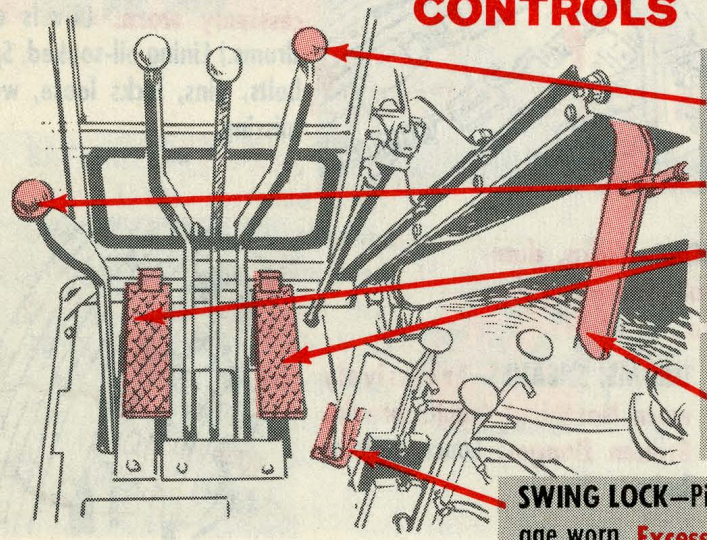
IGNITION SWITCH—Loose connections. **Broken.**

TROUBLE LIGHT OUTLET—Connections loose. Cover missing, dirty.

TACHOMETER—Glass broken, missing. **Needle broken, missing. Fails to operate when engine is running.** (Should show 1,725 RPM with no load; and 1,600 RPM with full load.)

HORN BUTTON—**Broken,** loose. Connections loose.

CONTROLS



LEVERS, PEDALS, LINKAGE—Loosely mounted. Not lubed. Pins, bushings, **bearings worn; out of adjustment. Locks fail to hold. Linkage excessively bent. Keepers, cotter pins, bolts, loose or missing.**

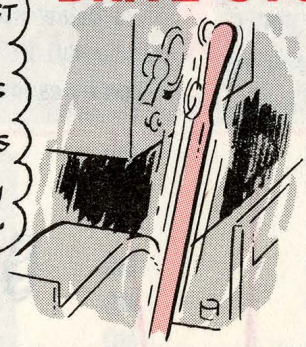
HAND THROTTLE—Bent linkage. Loose, **missing nuts** and bolts. **Fails to stay in pre-set position.**

SWING LOCK—Pins, springs, linkage worn. **Excessive play.**

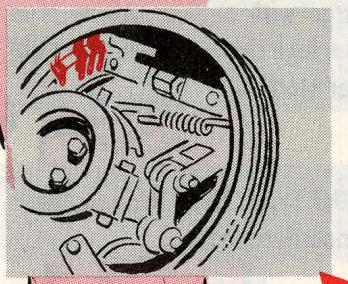
CHOKE—Fails to stay in pre-set position. Connections loose, bent.

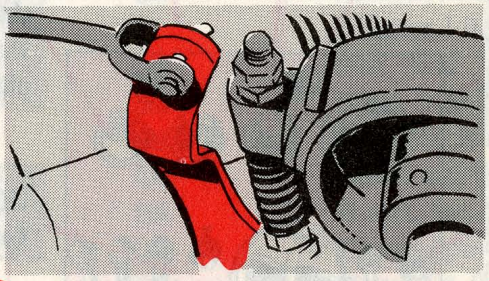
PRIMER—Fails to operate. Loosely mounted.

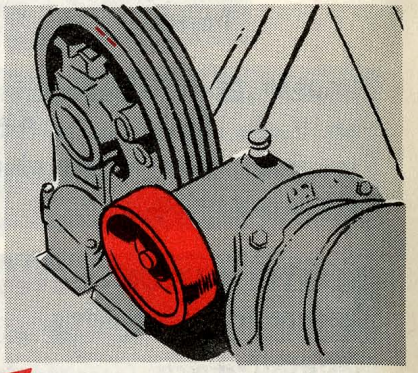
DRIVE SYSTEM

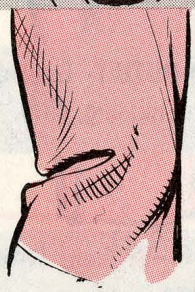


MASTER CLUTCH—Grabs, chatters while being engaged. Slips when fully engaged. Hard to engage, disengage. **Drags when being disengaged.**





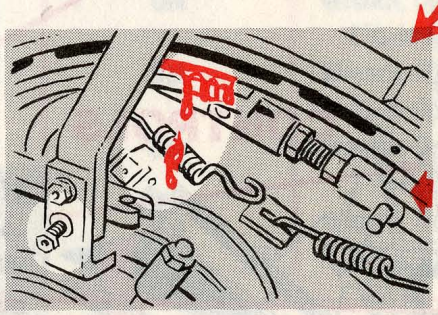




OPERATING CLUTCHES—(Swing, Crowd, Hoist)—Oil, grease on lining. **Bands, lining worn. Fulcrum arms, pins, links, anchors worn, out of alinement.**

BEARINGS, SHAFTS—Bearing caps, retainer bolts missing or loose. **Excessively worn, damaged bearings. Shafts out of line.**

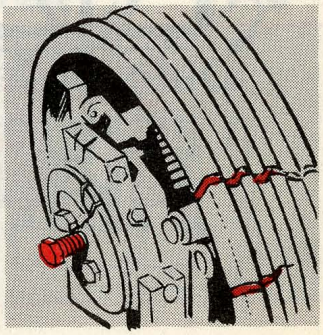
JAW-PIN CLUTCH—Excessively worn, not properly adjusted, will not engage, disengage.



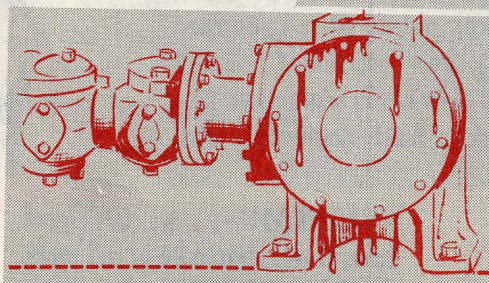
OPERATING BRAKES—Lining excessively worn. (Rivets contact drums.) Lining oil-soaked. Springs, bolts, pins, locks loose, worn or missing.

GEARS, PINIONS—Worn, damaged. Unusual gear noises during operation.

DRUMS, SHEAVES—Excessively worn. Not lubed. Cracks, breaks. Broken flanges. Loose, missing bolts.

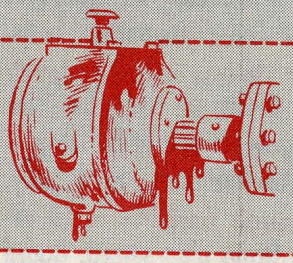


CABLES—Flat spots, **kinking, fraying, excessive wear.** Not lubed. Crossed on operating drums.

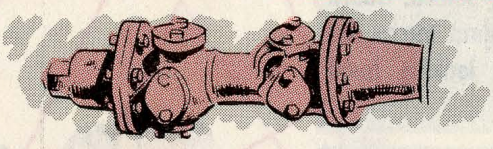


GEAR HOUSING CASES—**Seals, bearings, gaskets** worn, **leak.** Loose assembly bolts.

RIGHT ANGLE DRIVE, GEAR HOUSING — **Leaks. Breather clogged.** Case, seals leak. **Lubricant below level. Mounted loosely.**



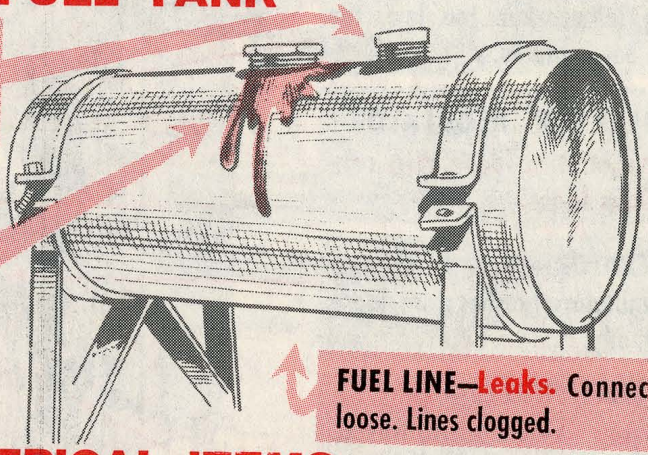
DRIVE SHAFT, UNIVERSAL JOINTS —Damaged propeller shaft. **Shaft out of line. Missing, loose bolts. Worn bearings.**



FUEL TANK

FUEL TANK GAGE—Glass missing, broken. **Needle missing, broken. Fails to register.**

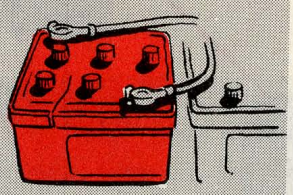
FUEL TANK—**Leaks.** Filler cap loose, dirty. Plugged vent. Dirt, crum around filler hole. **Tank mounting bolts loose or missing.** Drain plug seized.



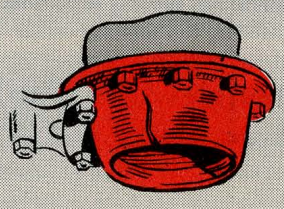
FUEL LINE—**Leaks.** Connections loose. Lines clogged.

ELECTRICAL ITEMS

BATTERIES — **Cracked, leaky cases.** Loose, corroded posts, straps, holddowns. Dirt, corrosion on top of battery. Loose, corroded, **damaged terminals, cables.** Electrolyte level low. (Should be 1/4-in above plates.) Specific gravity low. (Should be 1.225 temperature corrected.) **Filler caps** loose, **missing.** Vent holes clogged.



HORN SIREN — Loose mounting, connections. Cracked, bent, rusty.



ENGINE (Left Side)

HOSES, CLAMPS—Leak. Spongy, swelled (when engine is running). **Clamps missing, broken.**

FAN—Guard, shroud loose, bent. **Mounting bolts missing, loose. Blades bent.**

RADIATOR—Leaks. Air passages clogged. Loose mounting bolts. **Coolant below proper level.** (Should be at, or near, overflow with engine at operating temperature.) Coolant dirty, rusty, oily. **Not enough anti-freeze** (if required). Drain plug seized. Guard missing, loose. Coolant forced out overflow pipe (By leaking head gasket.)

THERMOSTAT—**Defective.** Operating temperature too low, too high. See Remarks.

GENERATOR REGULATOR—**Start mounting loose. Wire connections loose.**

GENERATOR—**Loose mounting.** Commutators, brushes worn, loose, dirty, oily.

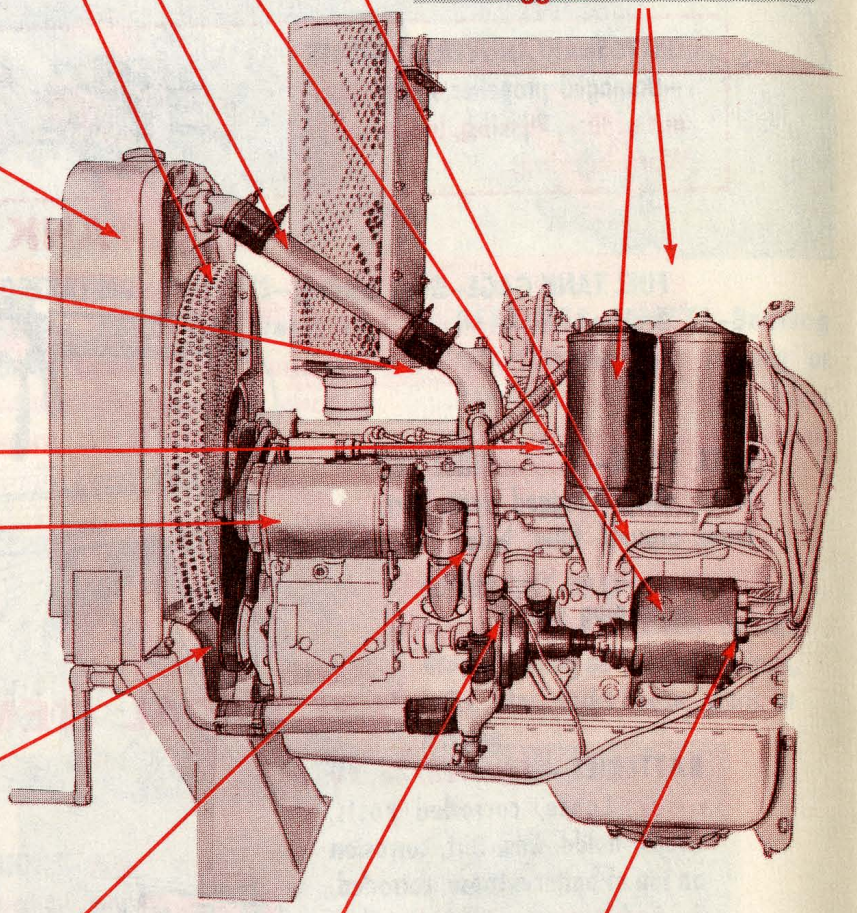
FAN BELTS, PULLEYS— **Belts excessively worn,** cracked, frayed, glazed. **Fan belts too loose, too tight.** (Belts should have a deflection of one-inch from normal position at a point midway between the pulleys.) Pulleys cracked, chipped; out of alinement; loosely mounted.

BREATHERS—Leaks. Rusty, dirty. Missing.

MAGNETO—Rotor cap, distributor dirty, corroded. Air vents clogged. Breaker points pitted, gapped wrong. (Point gap should be 0.014 to 0.018-in at full separation. (See remarks). Brush damaged, worn, binds.

CRANKCASE—**Leaks. Oil level low.** (Level should be at full mark on dipstick.) Oil dirty, contaminated.

OIL FILTERS, OIL COOLERS, LINES—**Leaks. Loose connections.** Dirty, **clogged.**



WATER PUMP—**Pump, connections leak.** Loose mounting.

OIL PUMP, PRESSURE RELIEF VALVE, LINES—Screen clogged. **Loose mounting, connections. Leaks.**

ENGINE (Right Side)

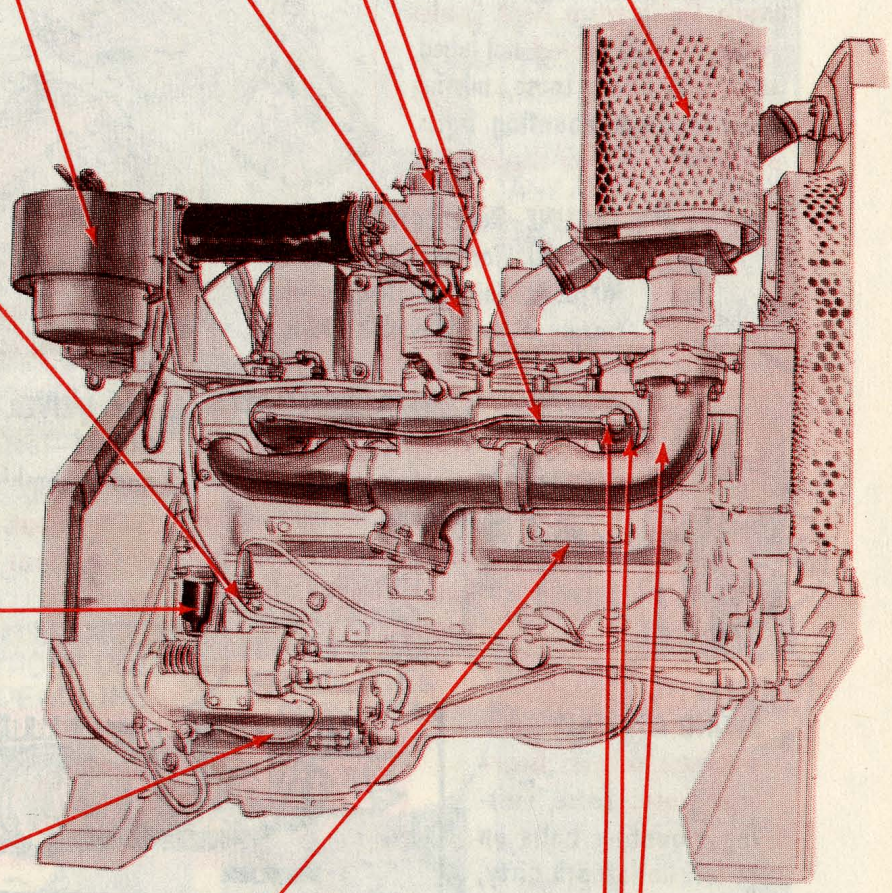
GOVERNOR, LINKAGE—**Engine surges at top speed without loading. Mounting bolts** loose, missing. Linkage not lubed, bent, binds.

CARBURETOR, LINKAGE—Mounting, assembly bolts, screws missing, loose. Linkage bent, worn. **Leaks.** Connections loose.

SPARK PLUGS – Dirty, loose, cracked. Pitted contacts. Wrong gap. (Should be 0.025 to 0.030-in).

AIR CLEANER—Loose, leaks. Dirty. **Oil level low.** (Should be at apex of disk.) **Screen clogged.** Gaskets, seals worn.

MUFFLER, TAIL PIPE—Loose, worn, cracked, holes. Screen loose or missing.



FUEL PUMP, HOUSING—**Leaks.** Mounting assembly screws, loose, missing. Water, dirt in sediment bowl. Screen dirty. Gasket worn, cracked.

FUEL FILTERS—**Leaks.** Dirt, sludge, water in sediment bowl. Screen dirty. Gasket worn, cracked. Chipped, cracked glass.

STARTING MOTOR—**Loose mounting bolts, Wiring loose, excessively frayed.** Commutators, brushes dirty, worn, loose.

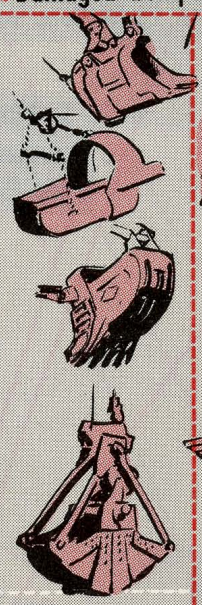
VALVES—**Excessive chatter. Loss of power.** Valve cover gasket cracked worn. Cover fits loosely. Locknuts missing, loose. Vent tubes closed.

CYLINDER HEAD, MANIFOLDS, GASKETS – Leaks. Loose, missing mounting bolts, nuts. Gasket worn, cracked.

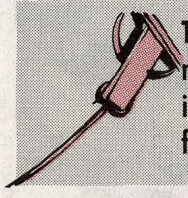
ATTACHMENTS

BOOM ASSEMBLIES (SHOVEL, CRANE, BACKHOE) — Cracks, Breaks, rust. Loose, missing bolts, rivets. Sheaves worn, broken flange. Bent members. Bushings, pins loose, missing. Foot pins excessively worn. Damaged bumper blocks.

DIPPER, DRAGLINE, BACKHOE, CLAMSHELL BUCKETS — Cracks, breaks. Sheaves worn, broken flanges. Loose, missing bolts, lock. Excessively worn dipper door latch, hinge, pins, bushings, retainers, bearings, and dragline bucket chains.



DRUMS, SHEAVES, CABLES — Bearings, bushings excessively worn. Shafts worn, bent. Cables worn, kinked, rusted, not lubed, strands broken. Loose, missing drum-lagging mounting bolts. Broken flanges on sheaves.



TAGLINE—Reel not lubed. Loosely mounted. Worn seal. Leaks, oil low in tubes. Fairlead sheaves bent, frozen so that they don't turn.

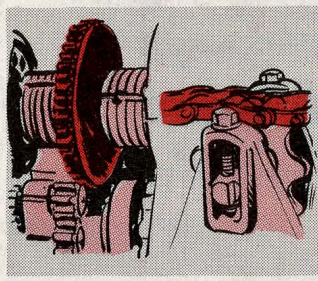
SHIPPER SHAFT, SADDLE BLOCKS — Excessive wear on wear plates. Dipper stick binds. Gears, sprockets worn, loose.

STICKS AND RACKING (SHOVEL AND BACKHOE)— Cracks, breaks on dipper handle. Worn, broken stops.

TEETH (DIPPER, BUCKET)—Excessively worn, broken, loose teeth. Unevenly worn teeth. Worn latch-keep insert.

FAIRLEAD—Loose, missing mounting bolts. Excessively worn sheaves, rollers, pins, bushings, guide plates.

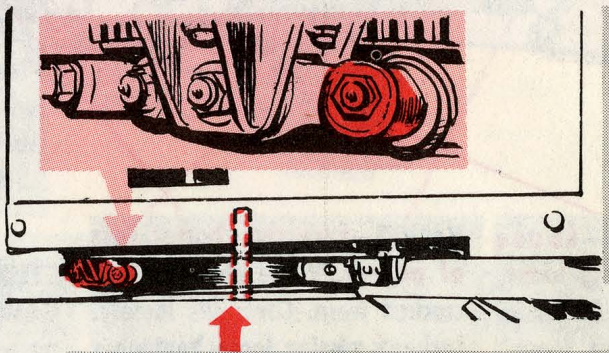
GANTRY—Cracks, breaks. Loose, worn mounting bolts. Worn sheaves, cables, pins, locks.



CROWD ASSEMBLY — Crowd chains, sprockets excessively worn. Chain too loose, too tight. Crowd cables, worn, flat spots, kinks, frayed, broken strands.

PILE DRIVER HAMMER, LEADS, GUIDES—Loose, missing mounting and assembly bolts and nuts. Guides bent, loosely mounted. Worn, bent leads. Cracks in weld.

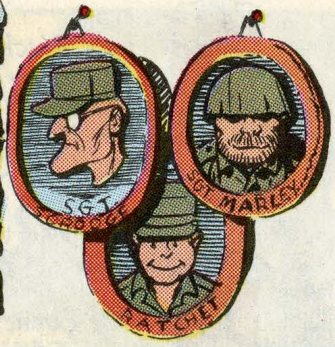
SWING ASSEMBLY—Jaw clutches, rollers, bearings worn. Loose, missing mounting bolts on roller. Rollerpath dirty, not lubed. Swing gear, pinion excessively worn, damaged.



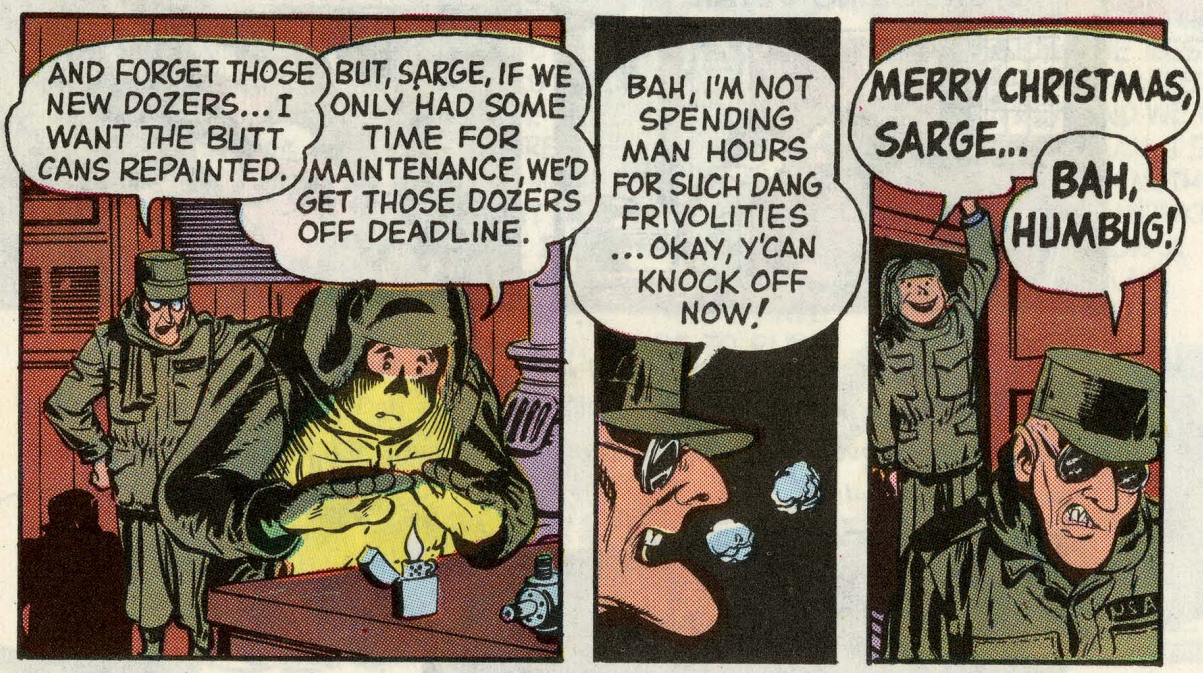
MACHINERY FRAME, BASE — Cracks, breaks, loose mounting and assembly bolts, pins, locks.

CENTER PIN (GUDGEON) - Excessively worn. Bushing adjustment nut and lock loosely mounted.

Joe's Dope, A Christmas Rock

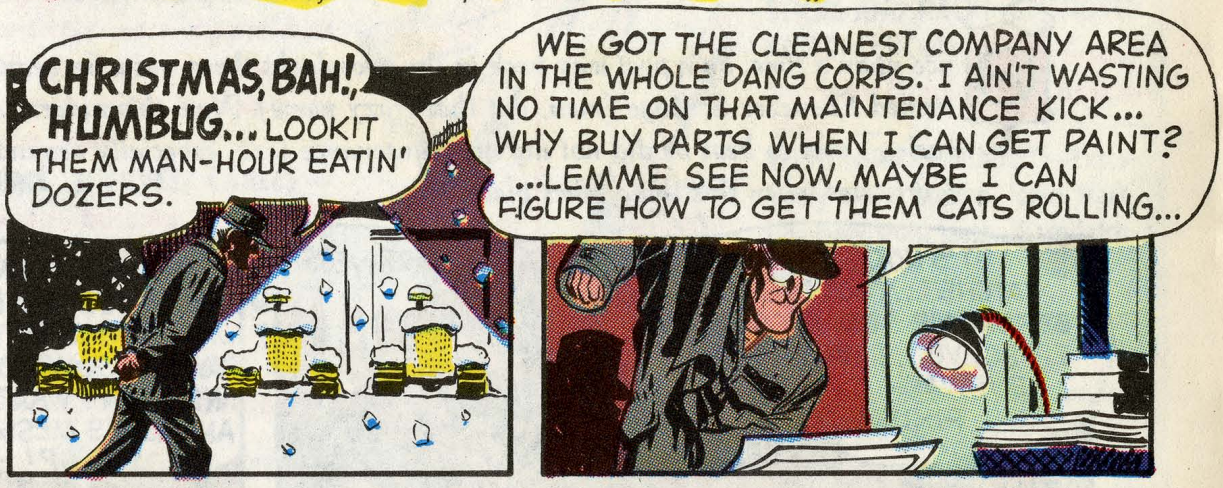


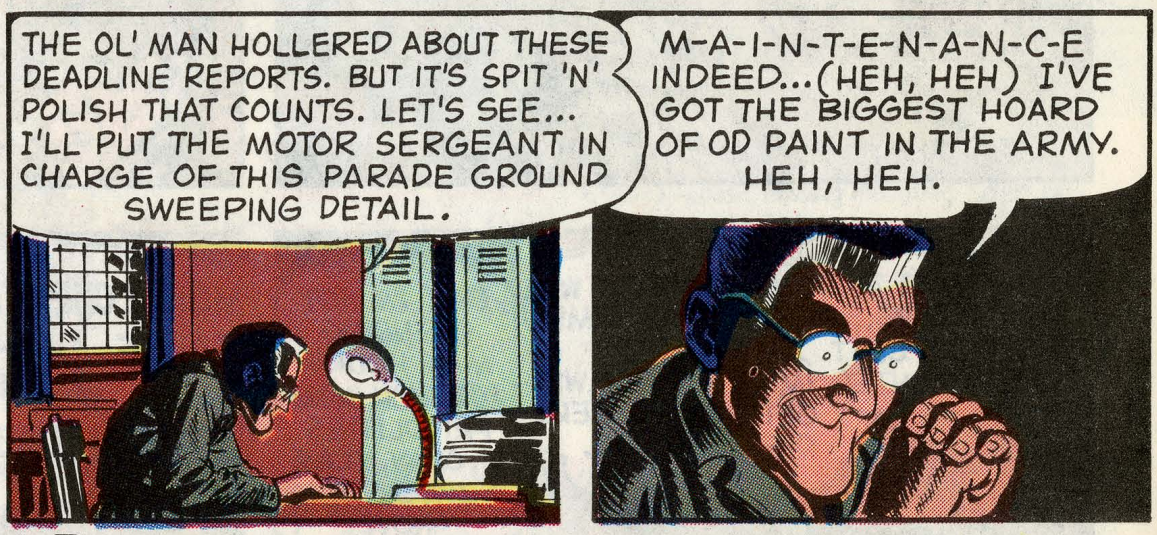
Once upon a time, on a post way back in the boondocks there was a Sergeant named Ebenezer Scrooge (man, dig that crazy name). Now this square, a real [illegible], was so beat he did not dig no maintenance jazz, especially around Christmas when this thing takes place.



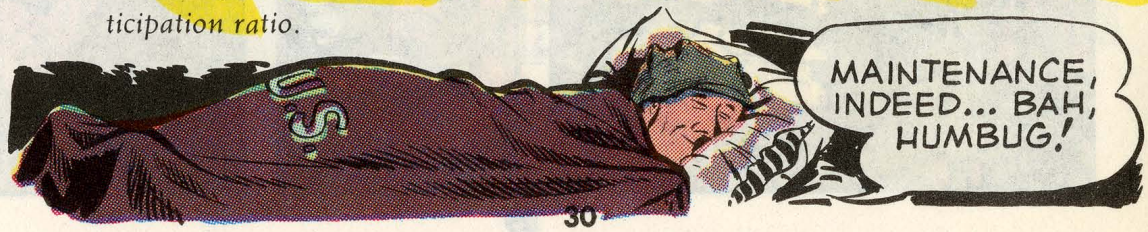
And so Ratchet goes to his home on the post where his wife and little boy Tiny Tim (who busted his leg in a Little League game) wait to share a late Christmas meal.

But Sgt Ebenezer Scrooge tooled back to his pad in the barracks (even though he had an invite from his nephew, who is a Warrant Officer.





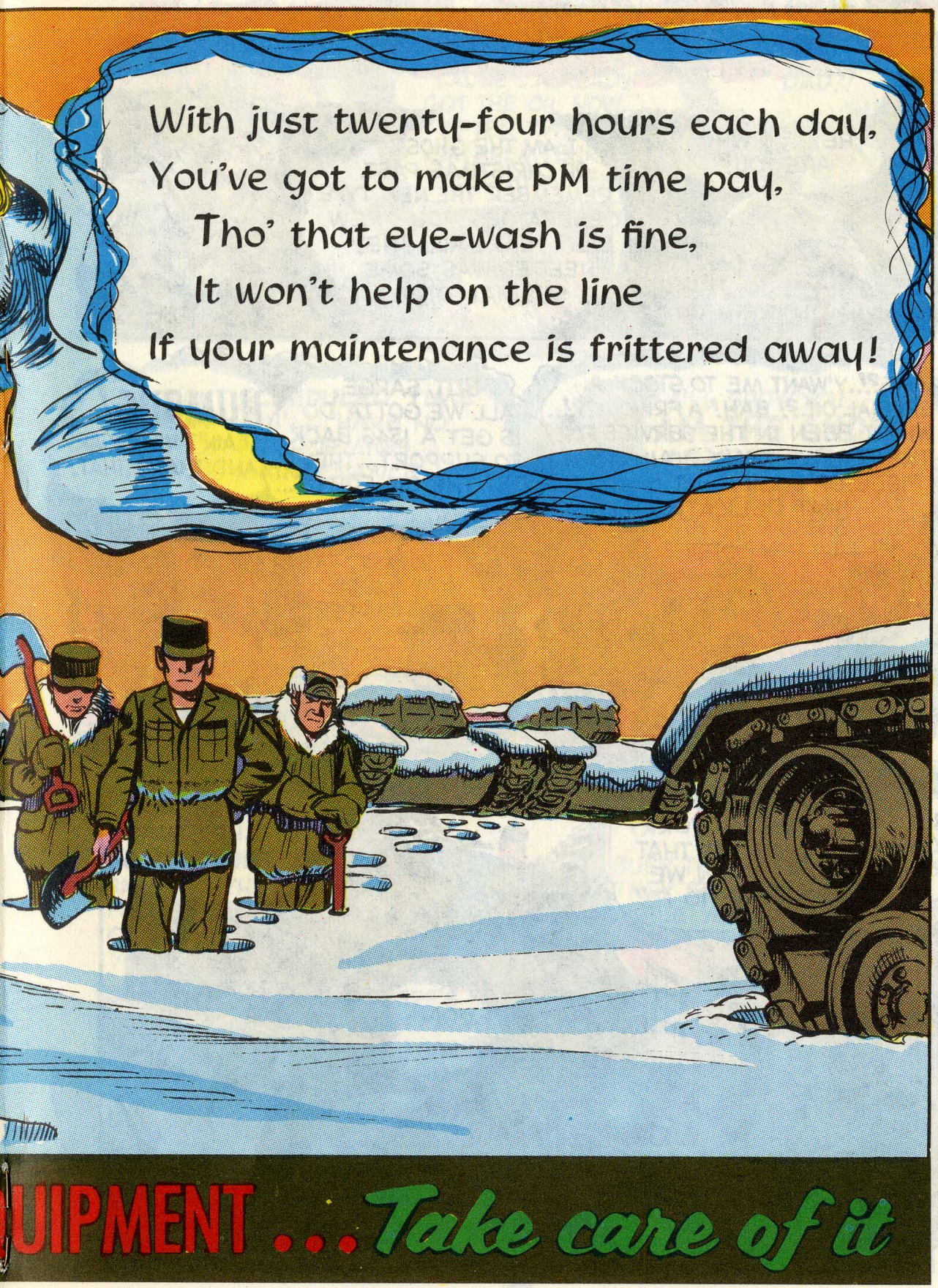
And so, after taking a last loving look at the white washed rocks out front, Scrooge turned off the crummy light over his desk and sacked in . . . smiling to himself over the size of the Company's Award Winning Hobby Shop participation ratio.



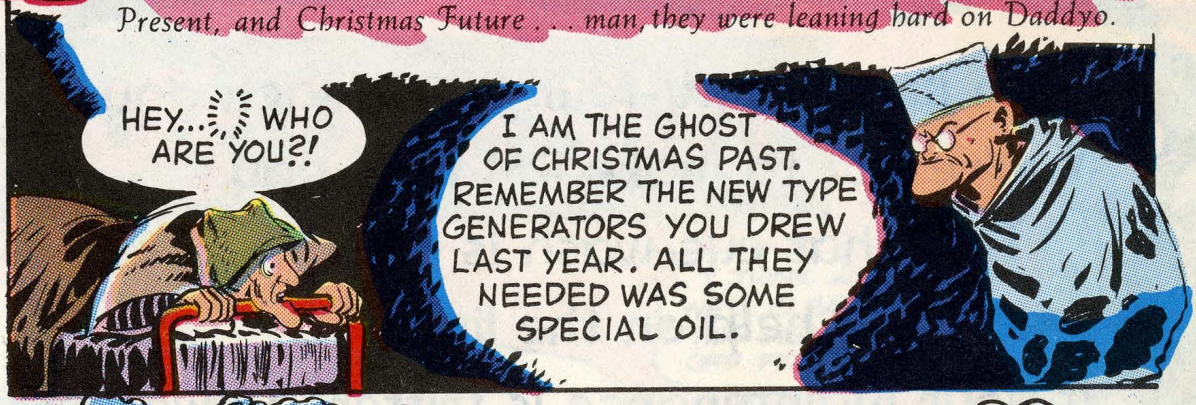
Suddenly . . . he is awakened by a gust of wind . . .
WHO'S THAT!?
IT'S ME, EBENEZER, ME-OL' JAKE MARLEY... YOUR OL' BUDDY... REMEMBER WE JOINED UP IN THE OIL FIELDS OF TEXAS AND ROSE IN THE RANKS...UNTIL, MOAN KOREA.
KLUK!
CLANK!
KLUNK!
CLUNK!
JINGLE!
CLANK!
CLUNK!
B-BUT Y'R DEAD... Y'GOTITUP IN HUNGNAM BACK IN 1950.
YES SOB REMEMBER HOW WE WAS UP IN THEM MOUNTAINS WHEN THE OUTFIT WUS TOLD TO SADDLE UP AND PULL BACK...THE ENEMY WUS BREAKIN' THRU LIKE GREASE IN A WET PAPER BAG...
...BUT THEN THE RED ARTILLERY WHOMPED AN AVALANCHE DOWN ON THE ONLY PASS DOWN THE MOUNTAIN SIDE...THEY CALLED MY DOZER TEAM IN.
BUT WE WERE IN NO SHAPE TO MOVE 'CAUSE, THEM DOZERS WERE DEADLINED...
AND DO YOU KNOW WHY...BECAUSE WEEKS BEFORE YOU GIVE US A "WRITE-MORE-LETTERS-HOME" LECTURE WHEN WE WANTED TO PULL MAINTENANCE. BUT YOU SAID IT WAS JUST A WASTE O' TIME. IF WE COULDA HAD REAL MAINTENANCE 'STEAD OF SPIT 'N' WIRE ... THEY'D HAVE BEEN IN SHAPE TO PLOW THE ROAD OPEN.
YOU KNOW THE REST! ...THE REDS BRACKETED THE AREA AND WE WAS CREAMED... MAN, I SURE WOULDA LIKED NUTHIN' BETTER THAN WORKING DOZERS FOR A CHRISTMAS PRESENT!

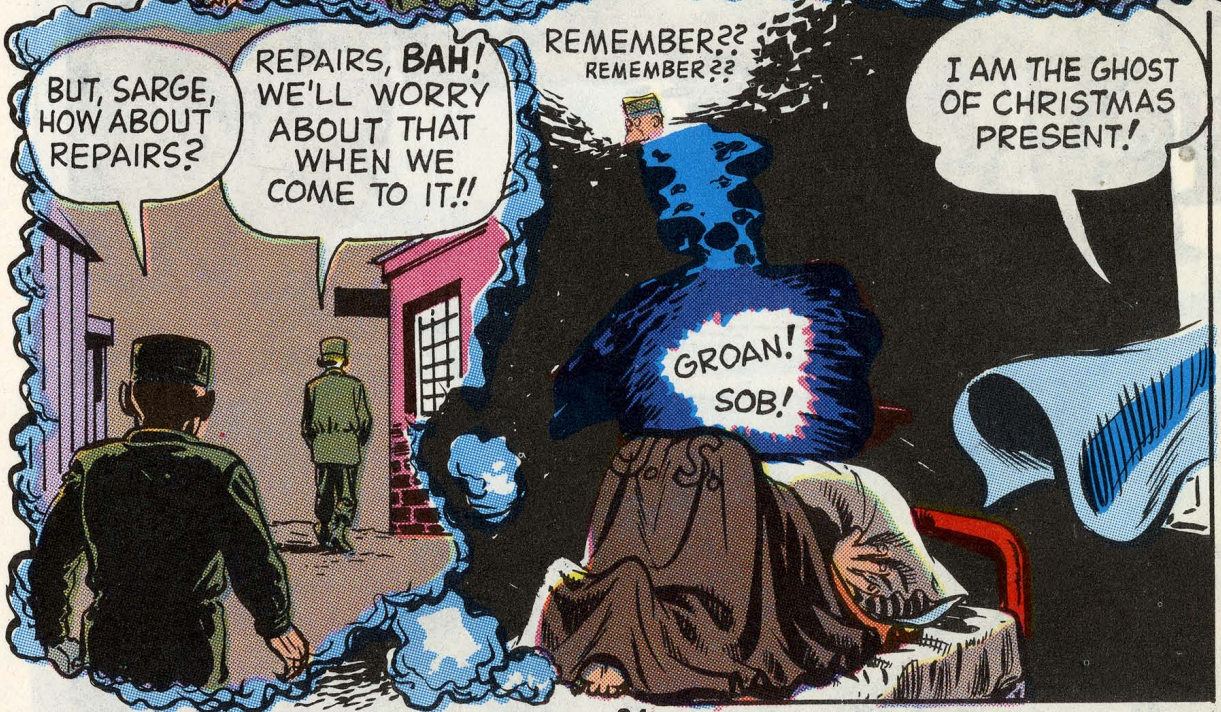
JOE'S Dope Sheet
I THINK WE'LL CLEAN THIS SIGN OFF FIRST.
WELCOME TO THE 3679th MED. TANK CO.
WE HAVE THE WORLD'S BEST EQ

JOE'S Dope Sheet
I THINK WE'LL CLEAN THIS SIGN OFF FIRST.
With just twenty-four hours each day,
You've got to make PM time pay,
Tho' that eye-wash is fine,
It won't help on the line
If your maintenance is frittered away!
WELCOME TO THE 3679th MED. TANK CO.
WE HAVE THE WORLD'S BEST EQUIPMENT ... Take care of it

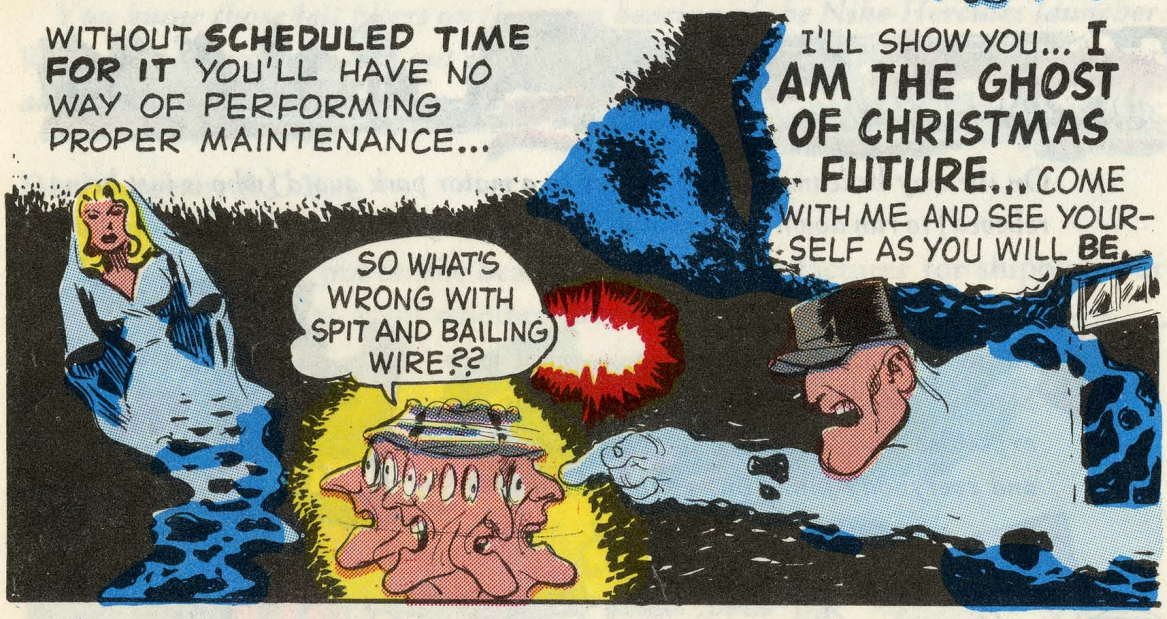

With just twenty-four hours each day,
You've got to make PM time pay,
Tho' that eye-wash is fine,
It won't help on the line
If your maintenance is frittered away!
UIPMENT . . . Take care of it

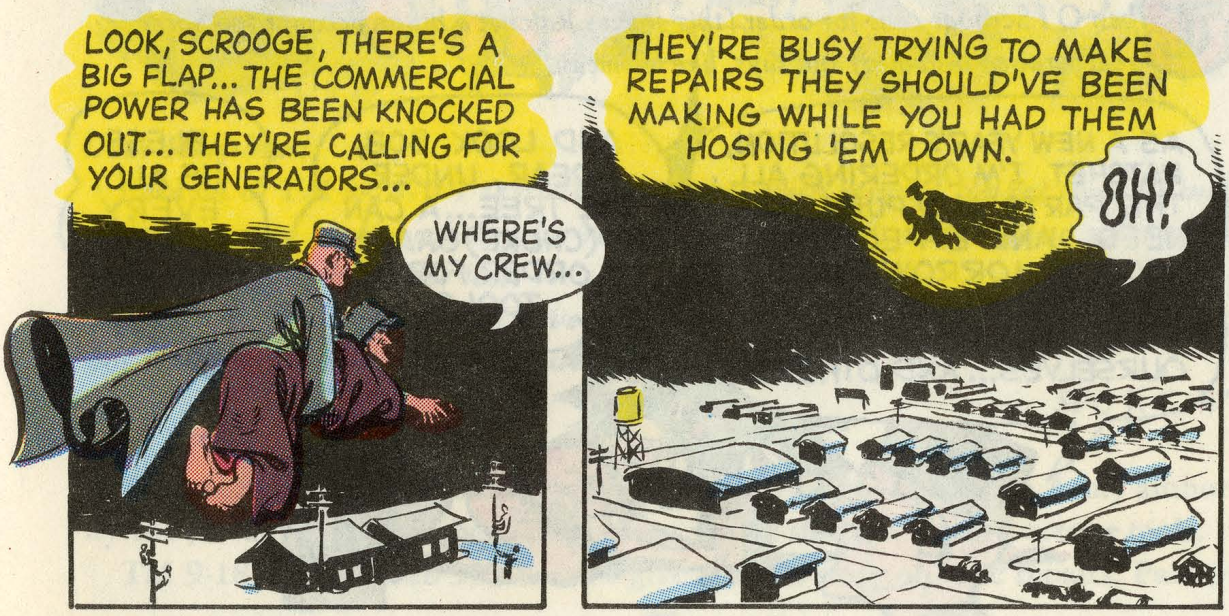
And with that, O'l Marley disappeared . . . but not before he warned Scrooge that he would be visited by three other ghosts Christmas Past, Christmas Present, and Christmas Future . . . man, they were leaning hard on Daddyo.

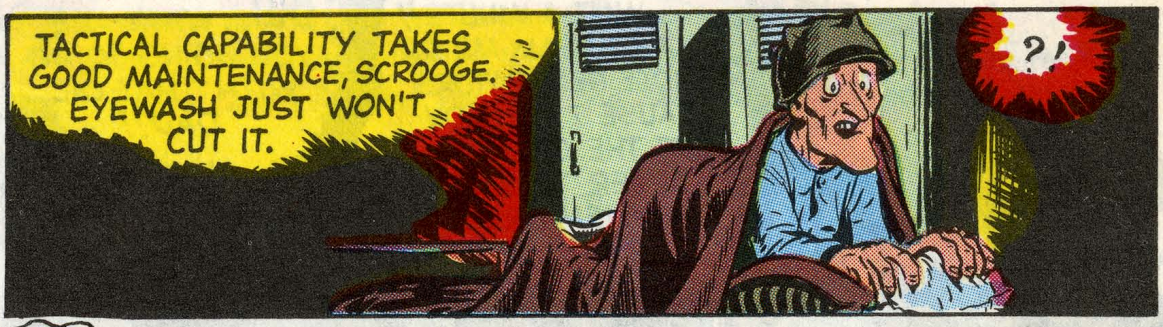




ABOUT THOSE GENERATORS
OH NO!! ANOTHER ONE!
...WAIT A MINUTE!! Y'CAN'T REAM ME ON THOSE GENERATORS 'CAUSE I ALREADY GOT THE OIL NOW... AFTER TWO OF 'EM (AHEM) BURNED UP. HEH, HEH.
BUT... WHAT ARE YOU GOING TO DO WITH THAT OIL, DAD!!


WITHOUT SCHEDULED TIME FOR IT YOU'LL HAVE NO WAY OF PERFORMING PROPER MAINTENANCE...
SO WHAT'S WRONG WITH SPIT AND BAILING WIRE??
I'LL SHOW YOU... I AM THE GHOST OF CHRISTMAS FUTURE... COME WITH ME AND SEE YOURSELF AS YOU WILL BE.

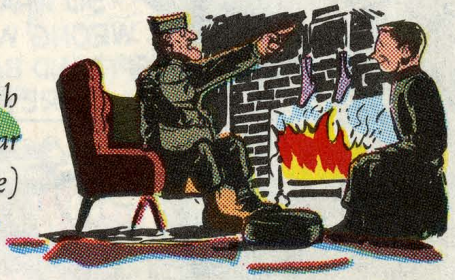

LOOK, SCROOGE, THERE'S A BIG FLAP... THE COMMERCIAL POWER HAS BEEN KNOCKED OUT... THEY'RE CALLING FOR YOUR GENERATORS...
WHERE'S MY CREW...
THEY'RE BUSY TRYING TO MAKE REPAIRS THEY SHOULD'VE BEEN MAKING WHILE YOU HAD THEM HOSING 'EM DOWN.
OH!



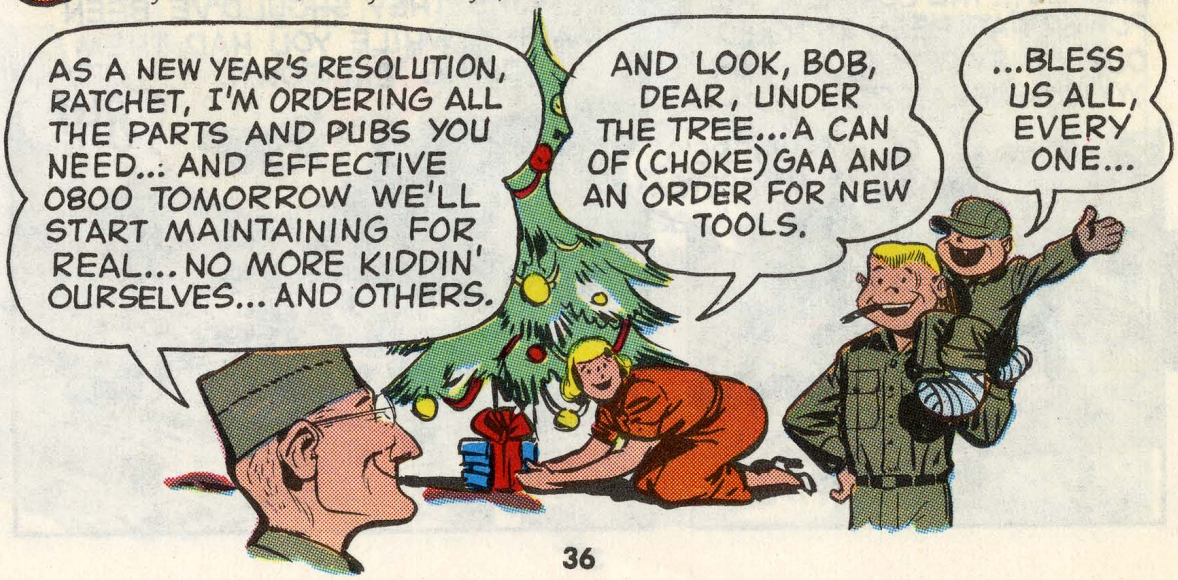
And so, the next morning a new Ebenezer Scrooge awoke . . . Dressed in his newest Class A's wearing new jump boots and War II ribbons he jumped into his jeep (after pulling his before operations checks) and ran over to Bob Ratchet's pad.

On the way he leans out and hollers to a motor park guard (who is just being relieved) to run down to the motor sergeant and get the biggest TM he can find.

Man, what a ball they did have . . . what with Scrooge tellin' little Tiny Tim about his war experiences (some of which were quite true) and everybody filling out 1546's like mad.



Then O'l Scrooge calls for order (this shakes Ratchet a bit on account the Sarge really raised his voice) and says, like we mean,



FELT FILLERS FALLING?

Dear Half-Mast,

You know those felt fillers on the main bearing of the Nike-Hercules launcher? Well after launchers were out in the weather for awhile, the fillers rotted away and dropped out. How do we get new ones?

Sgt R.O.R.

Dear Sergeant R.O.R.,

You don't.

Those fillers were put on the bearings by the manufacturer for shipping purposes. Makes no never-mind whether they fall out or you take 'em off.

Half-Mast

TUBE TEARS

Dear Half-Mast,

Para 64 of TM 9-1870-1 says all inner tubes with injuries longer than ¾ inch must be sent to higher echelon for repair. But our unit's been told to salvage all inner tubes costing $10 or less.

Why scrap tubes that only have nail holes . . . just because the unit can't get hot patches or because the hot-patching tool is broke?

SFC J. C. W.

Dear SFC J. C. W.,

That $10 rule must've come from a local SOP, Sarge. There's no Army authority for salvaging inner tubes just because you're short of repair parts or tools.

TM 9-1870-1 (18 Feb 55) doesn't give the full story on tube repairs. Para 3e

(14) of TB 9-1870-½ (27 Feb 57) says tubes smaller than size 9.00 that're damaged enough to need **depot** repair are not economically repairable.

But even these small tubes may be economically repairable at 3rd or 4th echelon if they only have nail holes. And tubes that are size 9.00 and up may be economically repairable even if they have to go back to depot for repair.

So . . . regardless of size or cost . . . let your Ordnance support decide whether those damaged tubes are economically repairable or should be scrapped.

Half-Mast

CHAIN CHANGES

Dear Half-Mast,

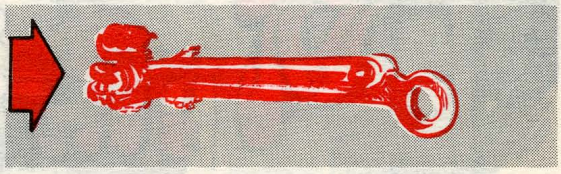
How can I get new chains to use in towing commercial vehicles with the M62 Wrecker? They're always breaking, and I'm told the only way to get new chains is to order the whole towbar assembly.

Can you help me?

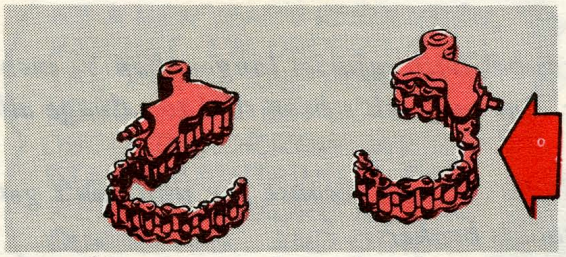
SP4 J. R. M.

Dear Specialist J. R. M.,

That's the way it's been on those towbars. Bar, towing, "V", universal type, has included chains which were to be had only when you ordered the unit.



Also, this assembly now has a new FSN that's different from the one in ORD 7 SNL G744 (24 Apr 56). It's now FSN 4910-735-6056.



But things'll be different from now on with the Clamp, assembly... including the chain that goes through the clamp and hooks onto the towbar. This assembly now can be ordered as a separate item. It's tagged with FSN 2590-679-9648 (G-744).

That'll cut down a bit on the excess parts you have to get to replace those broken chains—then you only need to turn in the clamps.

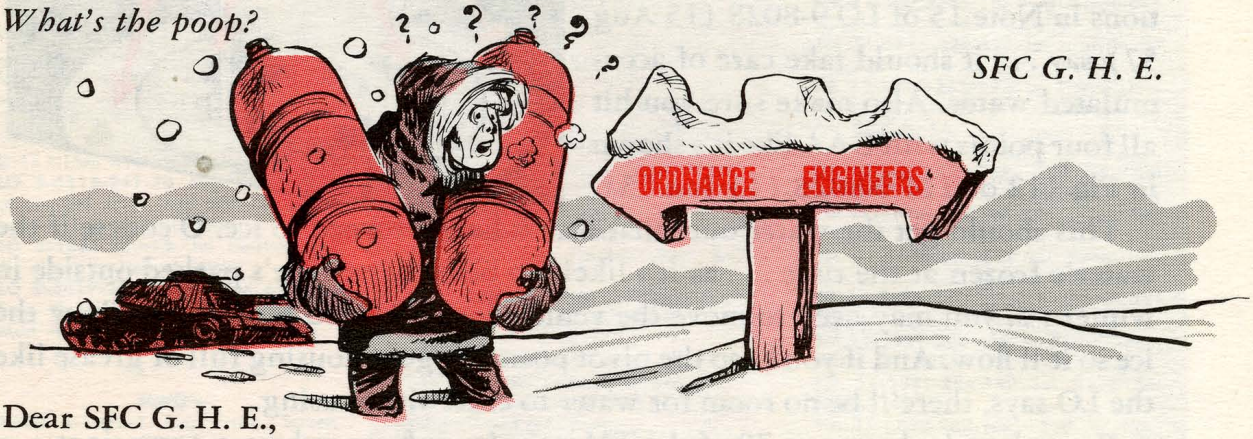
Half-Mast

WHERE TO GO

Dear Half-Mast,

I understand there's been a changeover on which technical service is responsible for supplying the fixed fire extinguishers for the M48-series medium tanks. What's the poop?

SFC G. H. E.



Dear SFC G. H. E.,

You understand right. The Engineers took over control from the Ordnance Corps on the fixed fire extinguishers that go in tracked vehicles.

The stock number was changed from FSN 2520-771-4476 to FSN 4210-202-6465 for all tracked vehicles—except the M74 tank recovery vehicle which gets a cylinder under FSN 8120-286-5579.

But don't forget—Ordnance is still responsible for the lines, fittings and the way these fire extinguishers are fitted in the tanks. So, if you have any installation difficulties, get in touch with your Ord support unit.

Half-Mast

ICE-PACKED GEARS

Dear Half-Mast,

Last winter when the boom was traversed on our wrecker, it gave out with a chattering noise like the gears were chewing up rocks . . . and no wonder. The pivot post gear housing was iced up solid. It melted down to more'n a gallon of water.

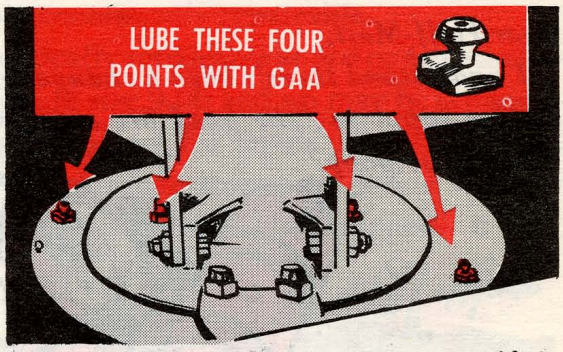
How about leaving the drain plug out of the underside of the pivot post base plate on wreckers in winter to avoid this freeze-up?

Sgt A. R.

Dear Sgt A. R.,

Some water may collect in that pivot post housing 'cause it's not completely waterproof. That's why there's a drain plug underneath.

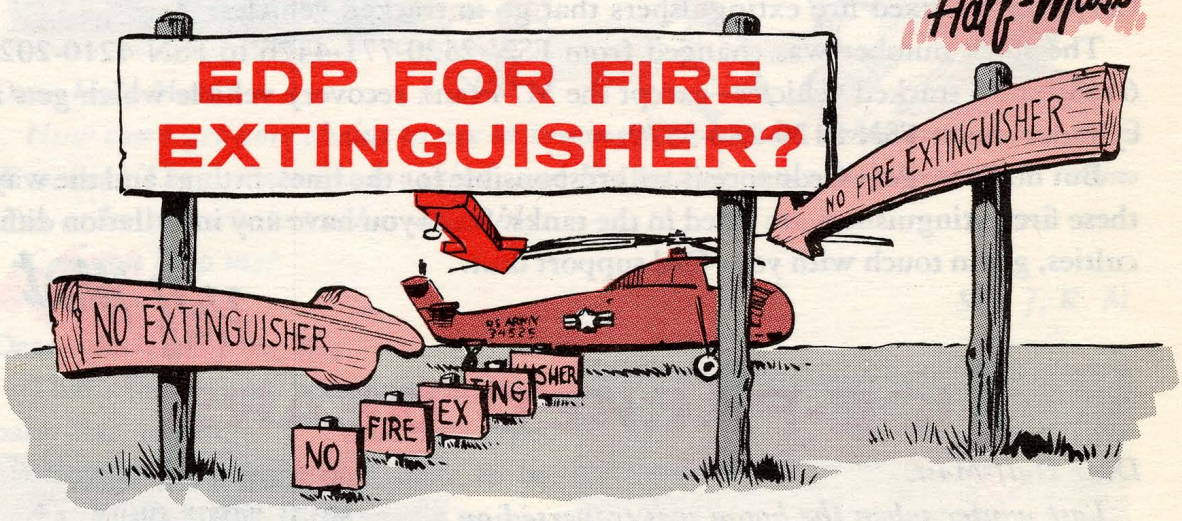
If you take out the drain plug and give the boom a couple of turns before each weekly lubing . . . like the directions in Note 15 of LO 9-8028 (15 Aug 57) say . . . it should take care of accumulated water. Also make sure you hit all four points with GAA like it's shown in Fig 112 of TM 9-8028 (13 Jun 55).



This should get the water out—that is if it hasn't turned to ice. O'course if the water's frozen at the time . . . as it's likely to be if the vehicle's parked outside in winter . . . you may need to move the vehicle into a heated building to thaw the ice so it'll flow. And if you keep the pivot post ring gear housing full of grease like the LO says, there'll be no room for water to enter the housing.

Best take a look at para 70 of the TM, too, for info on sub-zero operations.

Half-Mast



Dear Half-Mast,

Is an aircraft properly EDP if the fire extinguisher is not in it? I can't find any regulation that calls it out positively.

SFC M. R. H.

Dear SFC M. R. H.,

No, you won't EDP the aircraft for a missing fire extinguisher. Red diagonal the ship and make doggone sure that anyone releasing it for flight, and everybody riding in it, knows that extinguisher is missing.

Then, start up a hotshot requisition for your extinguisher like it says in par 96, AR 711-16 (18 Apr 56). Which really means that you get the same treatment as if the aircraft were EDP, but you don't call it EDP because it is still possible—if not very smart—to fly it without the extinguisher.

Half-Mast

THE SCOOP

A selected list of recent publications of interest to Organizational Maintenance personnel.

LUBRICATION ORDERS

LO 5-490-202-12 Jul Shop Equip Cont Maint Set Nr 3 Trk Mtd.
LO 5-6115-234-20 Jul Gen Set, Diesel Eng; 15 KW AC 120/208 240/416V 3Ph 60C Convert to 12.5KW 50C Skd Mtd (Winpaver Mod D-15 H18M w/Herc Eng Mod DD-198).
LO 5-6115-241-20 Aug Gen Set as above but JETA Mod MD 151815-W w/Herc Eng Mod DD-198.
LO 9-1055-203-15 Jul Heating and Tie-down for Honest John.
LO 9-3419-204-12 Jun Cut off Band Saw, 8x16 in (W.F. Wells and Sons Mod H).

MWO's

MWO 5-1053-1 Aug Crush, Screen, Washing Unit 50th Pioneer Mod 33 Triplex.
MWO 5-1054-1 Aug Crush, Screen, Washing Unit, 50 tons PH.
MWO 5-2329-1 Aug Gen Set 45KW 400C Cummins Mod JSGA 601-45 (MWO 5-6100-200-34/1 Aug for Stewart-Stevenson Mods 26200 and 28100).
MWO 9-2320-209-20/1 Aug 2½-ton Shop Van access loader.
MWO ORD Y25-W3 Aug Nike-Herc Acq Ant.
MWO ORD Y83-W2, Y83-W7, Y84-W5 and J753-2-W23 Aug Nike test sets.
MWO 10-1653A1 Aug Electric Fork Lift Truck Baker Rauling Mod FSHG 20/48, mounting resistor assembly.
MWO 10-1694A3 Aug 10,000 lb Warehouse Crane Federal Mod NC-10-QM eng compt, lever guide, hoist lock.

TECHNICAL BULLETINS

TB 9-1400-609-25 Jul Nike Cables.
TB 9-1410-251-12/3 Aug Nike-Herc Warhead torque.
TB 9-1430-251-20/2 Aug Nike-Herc az-elev trans clutch slippage.
TB 9-2320-209-15/1 Aug 2 1/2-ton trucks M44 chassis (stick-shift) rear axle shaft flange fractures.
TB 9-2320-212-20/1 Aug 3/4-ton trucks, M37/M37B1/M42.
TB 9-2320-213-10/1 Aug M274 Mule: Starting.
TB QM 96 Aug Sleeping bags.
TB QM 98 Aug Rain/wet weather wear.

MAINTENANCE FORMS

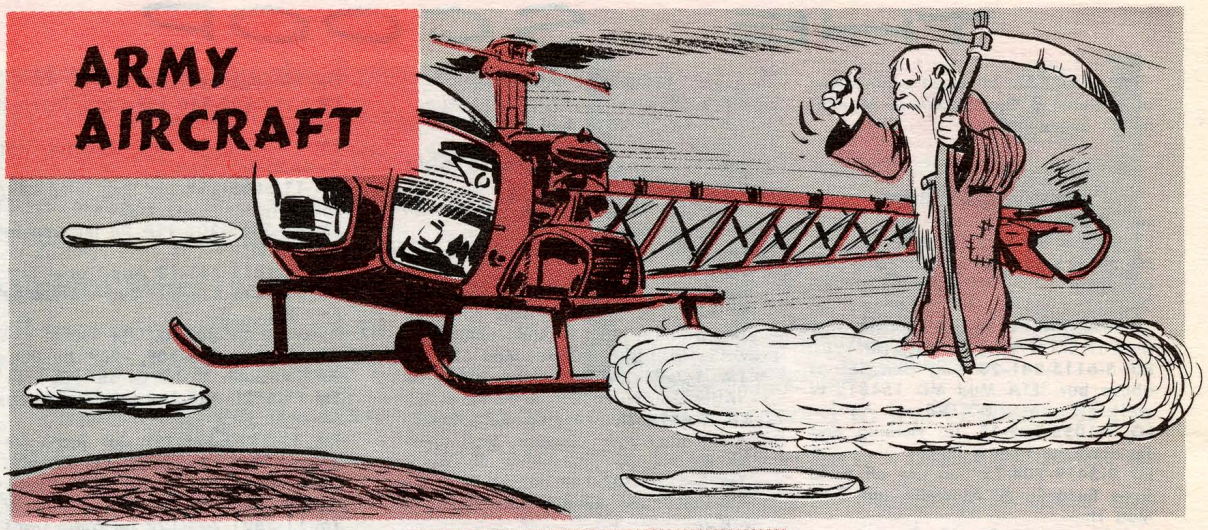
DA Forms 9-99, 9-100, 9-101, 9-102 Jun Nike-Ajax check sheets.
DA Forms 9-33 (Aug), 9-59 (Jun), 9-91 (Jun) Nike-Herc check sheets.
DD Form 1275 Aug Unsatisfactory Report (Aircraft).

MISCELLANEOUS

TRAINING Circular 17-6 Jul M48A1 Tank Loader's Guide.
FM 23-43 Jul M56 90-MM SP Gun.

TECHNICAL MANUALS

TM 1-1H-19-571, -577, -1011 Aug
TM 1-1H-34-1003 Aug 5000 lb Cargo Hook.
TM 1-1H-34A-4, -541, -546, -552 Ch 1, -4-20P, Jul and Aug.
TM 1-1H-37A-1, -1044, -4-20P Jul and Aug.
TM 3-1040-208-15P Aug Acft Smoke Tank M3 fill line.
TM 5-3810-206-20 Aug 40-ton Crane Shovel (Harnisch feger Mod 855 BG).
TM 5-3825-206-12P Jul 1,000 gal Water Distributor (Butler Mod 6743).
TM 5-3825-207-12P Aug 1000 gal Water Distributor (Roscoe Model MOE).
TM 5-4120-201-12 Aug 18,000 BTU Air Conditioner (Receny Mod BAF-5818).
TM 5-4120-207-12P Jul 26,500 BTU Air Conditioner (Ready Power Mod R 60C2).
TM 5-4210-210-12P Aug 1500 GPM 2,000 gal Fire Fighting Trailer.
TM 5-4310-207-12P Aug 115 GPM hand-trk mtd cent pump.
TM 5-4310-216-15 Aug 5 CFM 175 PS 1 Recip Compressor elec or gas (Champion).
TM 5-4320-204-12P Aug 100 GPM hand-trk mtd recip pump.
TM 5-4930-202-12P Jul Powered Winterized Lubricator (Gray Mod 250-530).
TM 5-6115-207-20P Aug Generator Set 30KW 400C (Hobart Mod H F30GM).
TM 5-6115-216-10 Aug Generator Set 5KW skd mtd (Hol-Gar Mod CE-52M-AC).
TM 5-6115-258-12P Jul Generator Set 45KW AC 400C (Cummins Mod JSGA-601-45).
TM 5-2815-202-12 Aug Diesel Engine (Cat Mod D-339) replacement.
TM 5-8120-201-12P Jul Lex Storage Tank Trailer 19,000 lbs w/pumps (Cambridge Mod 217-30).
TM 9-1005-223-12P Jul M14 Rifle 7.62mm.
TM 9-1430-503-20P Aug Hawk acq radar.
TM 9-1450-500-10 Aug Hawk loader.
TM 9-5076-10 Jul Corporal Battery Control Center.
TM 9-6650-201-12 Jul Observation Telescope M48.
TM 9-9502-4 Jul Nike-Ajax servicing equip.
TM 9-9502-8 Aug Nike-Ajax valve flow Test stand.
TM 9-9502-13 Aug Nike Air-Leak Check equip.
TM 10-3930-204-10 Aug Fork Lift (Tonmotor Mod 540RS).
TM 10-3930-205-10, -20 Aug Fork Lift (Clark Mods 150, 150RS).
TM 10-4940-201-20P Aug Can/Drive Cleaner.
TM 10-500-37 Jul Airdrop 3/4-ton Truck.
TM 10-7360-201-20P Jul Mobile Bakery M-1945.
TM 11-1510-203-12P Jul L20A Aircraft electronic equip.
TM 11-3895-202-12P Aug Reel Unit RL-31, -31B, C, D, E.
TM 11-5805-200-12P Jul Telephone EE-8, A, B, C, D, E.
TM 11-5805-202-15 Aug Telephone Central AN/MTC-3.
TM 11-5805-217-20P Jul
TM 11-5805-246-12P Jul Terminal Telegraph TH-5/TG.
TM 11-5805-253-10P, -20P Jul Code Recorder RD-60/U.
TM 11-5805-254-15P Aug Telegraph/Phone Terminal AN/TCC-14.
TM 11-5815-206-12P Jul teletype Set AN/PGC-1.
TM 11-5815-245-12 Aug Signal Data
TM 11-5815-238-12P Jul Teletype Set AN/GGC-3, 3A.
Converter CV-395/U.
TM 11-5820-219-10P, -20P Jul Pulse Form Restorer TD-68/G, 68A/G.
TM 11-5820-308-12P Jul Junction Box J-85/G.
TM 11-5820-326-12P Jul Radio Frequency Oscillator O-270/FRT-26.
TM 11-5820-340-15 Jul Radio Receiving Set AN/ARW-26.
TM 11-5821-203-12P Jul Radio Transmitter AN/ART34.
TM 11-5821-204-12P Jul Radio Set AN/ARC44.
TM 11-5830-207-10P, -20P Jul Hospital Program Distrib. Sys.
TM 11-5830-214-12P Aug Vibrator Power Supplies PP-31/TIQ, PP-31A/TIQ.
TM 11-5841-209-10P, -212-10P, -213-10P, -214-10P Aug Radio Freq Tuners TN-178/APR-13 (180, 181, 200).
TM 11-5841-215-10P Jul Mixer Amplifier CV-124/APR-13.
TM 11-5895-231-10P Aug Radar Set Controls C-654/APR-9B (654A).
TM 11-5895-232-10P Aug Indicators ID-226/APR-9 (226A, 226B).
TM 11-5895-236-10P, -237-10P, -238-10P, -23910P Aug Radio Freq Tuners TN-128/APG9, 128B (129B, (129D) (130, 130B) (131, 131C).
TM 11-5895-235-10P Aug Power Supplies PP-337/APR9 (337A, 337B).
TM 115965-232-12P Aug Perm Magnet Loudspeaker LS-212/G.
TM 11-6125-204-12P Jul Motor Generator PU-235/U.
TM 11-6625-265-12P Jul Telephone Test Desk TS-715/FTC.
TM 11-6625-291-10P, -20P Jul Audio Level Meters TS-585A/U, B/U, C/U, D/U.
TM 116625-297-10P, -20P Jul Radar Test Set AN/UPM-33, A.
TM 11-6625-302-12P Jul Test Set TS-190, A/U.
TM 11-6625-305-12P Jul Crystal Rectifier Test Sets TS-268,A, B, C, D, E/U.
TM 11-6625-329-12P Jul Frequency Power Meter.
TM 11-6660-203-20P Aug Wind Measuring Sets AN/MMQ-1A, -1B.
TM 11-6740-211-20 Jun Photo Print Drier PH-684B/U.
TM 11-6740-215-10 Aug Photo Print Drier PH-679C/U.
TM 11-6740-216-10P, -20P Jul Photographic Contact Printer PH-680, A/U.
TM 39-H 4119-2-12P Aug Warhead Case and handling equip.
TM 39-T205-2-12P Aug Nuclear Capsule Extractor-Inserter Test Set T-205C.
TM 39-T4008-2 Jul Simulator.
TM 39-T4078-2-12P Aug Control, Monitor Warhead T-4078.
TM 55-2210-213-10 Aug 100- and 115- ton Diesel, American Locomotive.



BE SPECIFIC

Just a reminder that sometimes a statement can be too general, even though it's perfectly true as far as it goes.

Like when you fill out block 27 (Corrective Action) on your DD Form 781-2 after repairing an aircraft deficiency on your ship.

24. SYSTEM	25. SYM	26. PILOT'S AND MECHANIC'S REMARKS (Print one defect on one line)	27. CORRECTIVE ACTION	27A. TIME	28.

It was a defect, and you corrected it, yes? Yes, but NO you can't put "Corrected" in that block 27. The Man says "The word 'Corrected' can mean almost anything, and will **not** be used." (TB AVN 5, 11 Feb 55).

So you tell **how** you corrected it: "Replaced," "Repaired" or "Adjusted" as the case may be. And a brief description of the repair or adjustment. This gets you off the hook, and makes it easier for the next guy to tell just what the trouble was, and exactly what you did about it. OK now?

And let's not set up the old classic where Block 26 said "Engine missing," and block 27 said "Engine found and replaced." No wisecracks, please.

SPRING SPRUNG

You Bird-Dog handlers know that the tailwheel springs of your L-19A's can't always stand the gaff made by a hard landing.

OK, so the supply people know about this, and a better spring is coming into the system. However, there are lots of the old springs, FSN 1620-186-0645, still in supply. And since it can't be said to be a safety of flight problem, these springs will have to be issued and used up.

So all you can do is draw another spring from supply and install it, hoping for nice gentle landings.

MOJAVE TAIL SHAFT GREASE LOCK

You heard about the danger of over-greasing the tail rotor drive shaft couplings on your little Sioux helicopters. Well, it turns out that Big Brother suffers from the same ailment.

If you pump excess grease into the tail rotor drive shaft splined coupling right next to station 462, you can set up any one of three conditions, and none of 'em are good.

Pumping the splines too full will force the shaft aft, which puts undesirable and possibly destructive strain on the bearing supports. Or compresses the rubber coupling at the after end of the shaft, or both. And the other possibility is that you may burst the cap in the forward end of the shaft, and let grease into the hollow shaft. This will throw it out of balance, and probably give you a high-freq vibration.

OK, so they're working out a pressure relief type grease fitting for this coupling —but until it gets here, your best bet is to back off the knurled cap before greasing, then pump grease into the fitting until it comes out around the spline. Then you remove the surplus grease, replace and tighten the knurled cap. Wipe up and the job's done.

BEAVER BRAKES

Far too many Beaver (L-20) brake parts are being requisitioned.

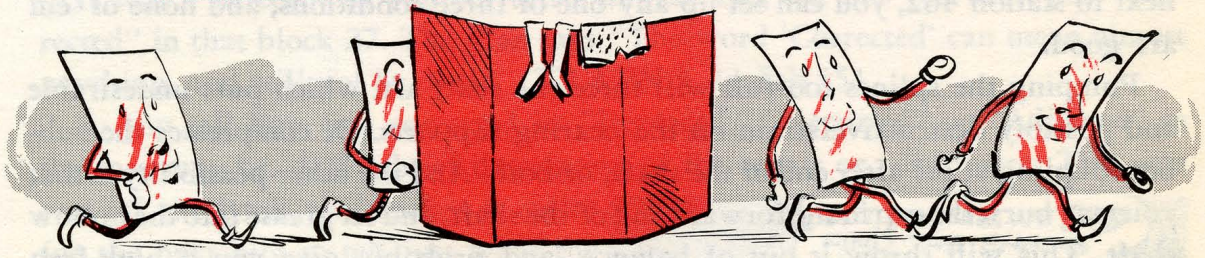
Either someone's squirreling away a stock of brake parts "just in case" or else the brakes are not giving adequate service.

If the brakes are failing, you can help the design people out by turning in UER's (DA Form 468's) on any Beaver brake failure you encounter. And they'd like to hear about any linings you have that don't last at least 150 hours, discs that go out with less than 400 hours, and any complete assemblies that fail for any reason.

With the dope from the UER's they can study the problem and come up with better brakes.

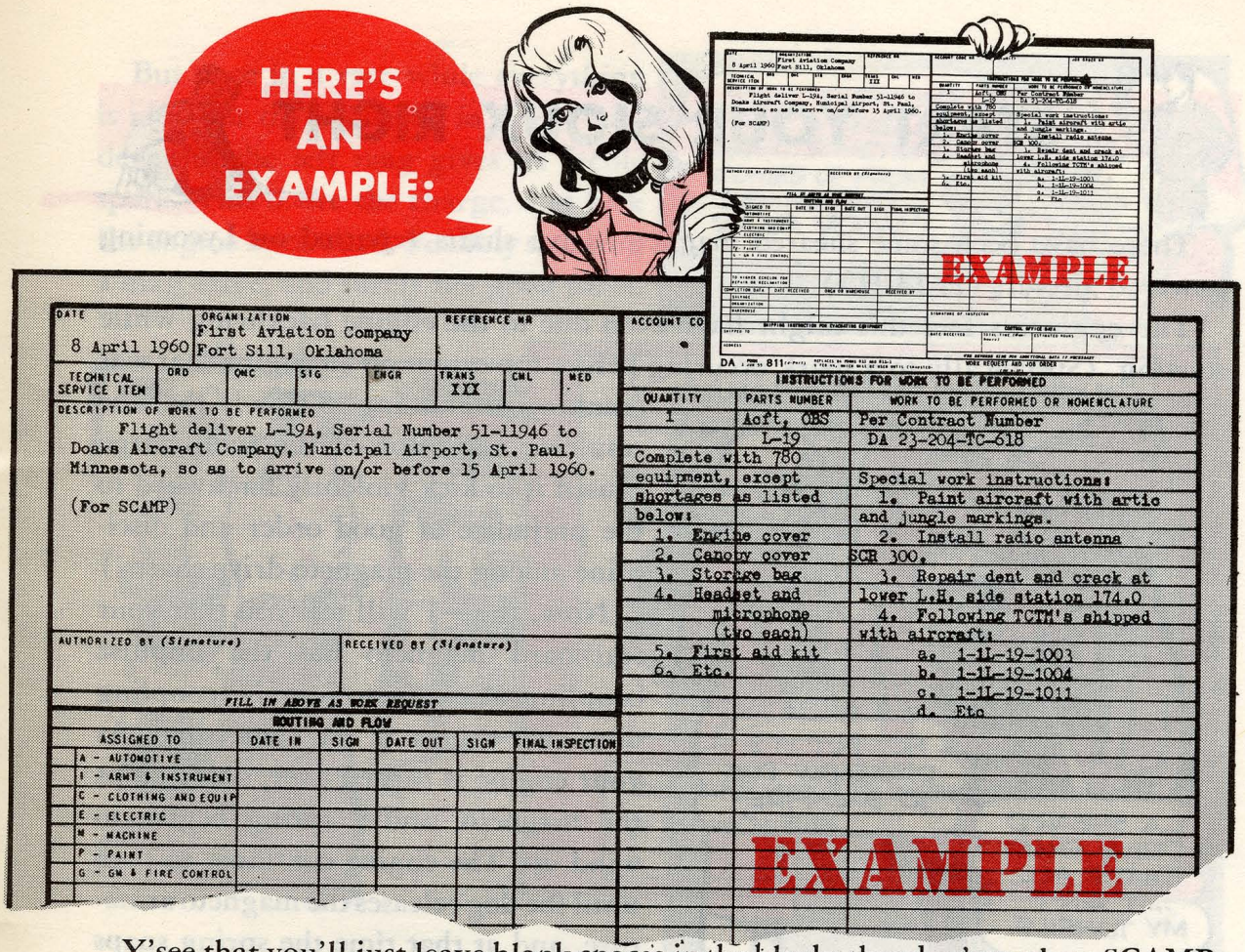
And y' might pass the word that the tech inspectors will be most unpleasant if they find a bushel of brake linings in some stock room. Get any surplus back into supply channels fast.

FORM CHANGE FOR SCAMP



OK, so you've been sending your aircraft to SCAMP facilities and getting 'em receipted for on DA Form 811. Just like it says in TCSMC-FAD letter of 12 Feb 59 and the new TB AVN 23-8 (14 July 59).

As you know, the 811 takes the place of the DA Form 477 called for by the old TB AVN 23-8 (22 Aug 57), so you'll use the DA Form 811 on all aircraft you send to SCAMP.



Y'see that you'll just leave blank spaces in the blocks that don't apply to SCAMP type maintenance.

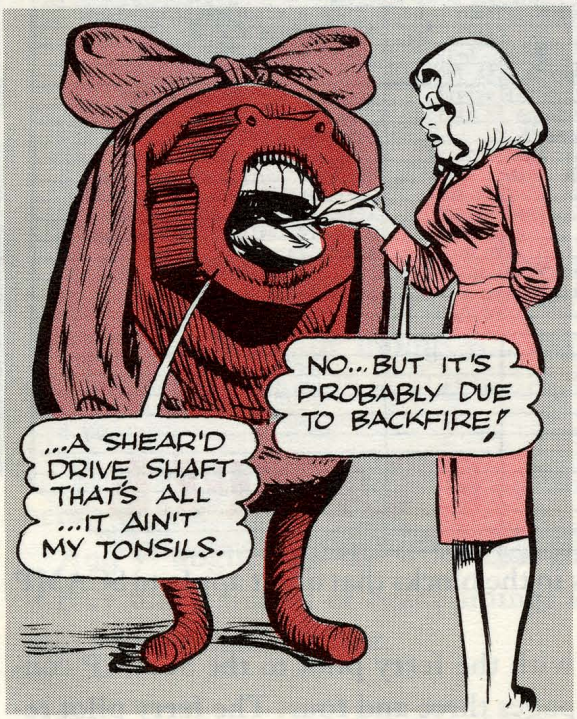
OK? Now, the whole ball of wax goes with the ferry pilot to the SCAMP contractor, who receipts for the aircraft on pages three and four. The ferry pilot returns these to you. Page four goes into your files to "support accountability" (show where your aircraft is) and you mail page three to:

Then when the job is done the accepting pilot will show on pages one and two any shortages of equipment or any special work not done. Page two is then given to the contractor as his receipt for the aircraft, and page one comes home with the bird.

START YOUR SIOUX RIGHT

There have been some sheared magneto drive shafts reported on Lycoming powered aircraft (H-13-H's).

The engineers feel this might have been due to the engine backfiring while starting. (Specifically to a spark occuring before top center on an engine that was cranking or running so slowly that the resulting explosion of the fuel charge caused it to kick violently **backward** to the prejudice of good order and discipline among the magneto drive shafts.)



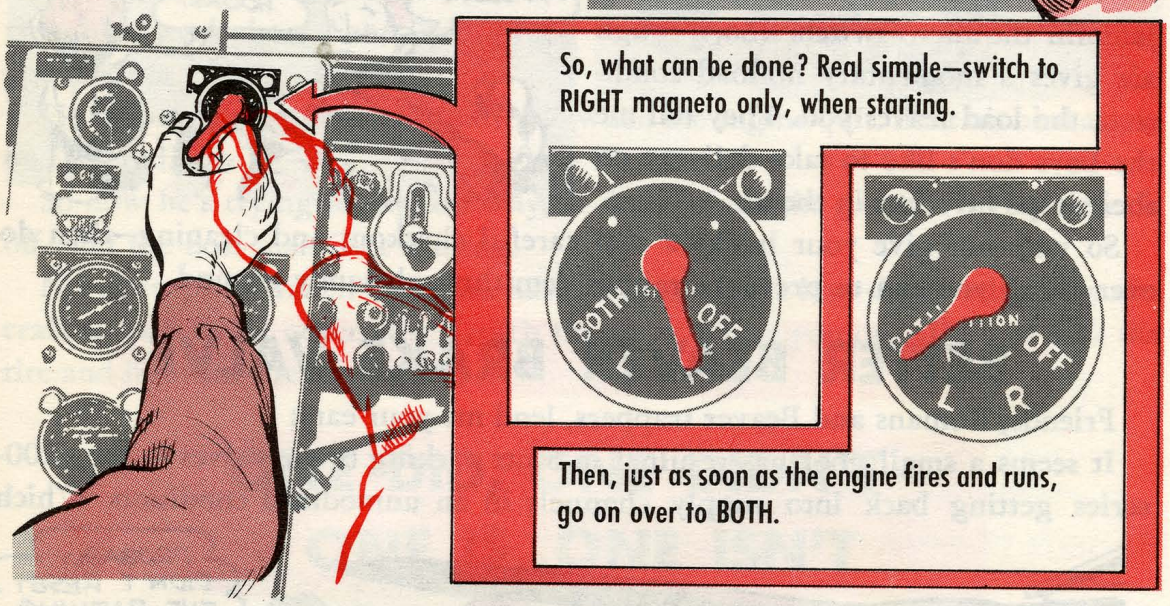
Now, the –1 will tell you that your starboard magneto has the impulse coupling. A magneto impulse coupling does two things at the same time. As your engine is turned over, a dog stops the magneto, and a spring begins to wind up. The engine continues to turn until the dog releases the magneto armature, and at that time the spring snaps the armature over, fast. This gives you a hotter spark than you'd ever get from the magneto at cranking speeds.

At the same time, due to the period of engine rotation during which the magneto was held, and the spring was winding, this fast flip and hot spark take place at a later part of the revolution of the engine. That is to say that the spark is retarded.

Which is just what you want here, some way to retard your spark so that it will not come soon enough to kick a slowly cranking engine backward.

The old –1 (Sect 11, page 2-3 of Ch 2, 9 Feb 59) told you to turn your magneto switch to BOTH when starting the engine. This works just fine 99 times out of a hundred because the slow turning left mag does not fire the engine, and the impulse-coupled right mag comes in with its hot, retarded spark to kick your engine off forward. Then as the speed comes up, your left mag cuts in, and the impulse coupling stops holding the right mag, you're off and running with both mags correctly timed.

But once in a rare while everything is ideal for the explosion in your cylinder, and the left mag gives its feeble spark. This'll fire the charge, and kick the engine **backward**. Possibly shearing a mag drive, and surely not good for it.

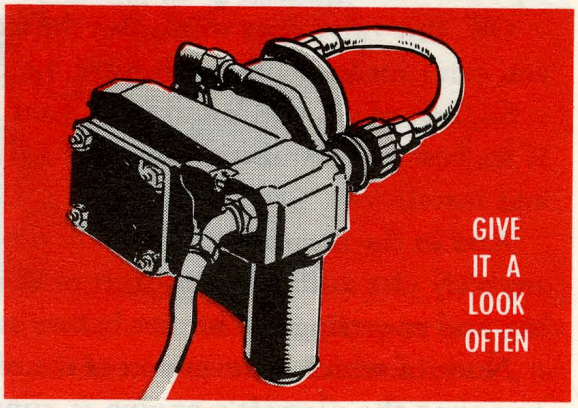


She'll start just as promptly, and you've eliminated the slight possibility of a bad kick. You'll find these instructions in para 4-109 on page 4-33 of TM 1-1H-13H-2 (March 58).

The —1 has been changed, and TMSC EH-13 (9 Feb 59) gives you the word.

CHOCTAW HOSE

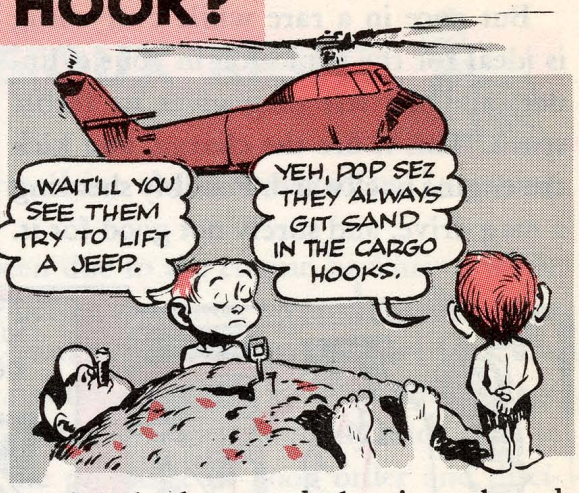
Take a quick look at the pump-to-filter hose on your main rotor primary hydraulic system. (Item -38, Fig 4, Page 20, TM 1-1H-34A-4, Change 2, 13 Aug 58).



Couple of 'em have carried away about an inch and a half from the pump fitting—possibly from bein' pulled too hard when they were put in.

Anyway, the manufacturer is working on a longer hose for use here, and it would be smart to look at yours every so often until the new one comes along.

SANDY HOOK?



Not the seaward end of New Jersey—the cargo hooks on your Choctaws (H-34's).

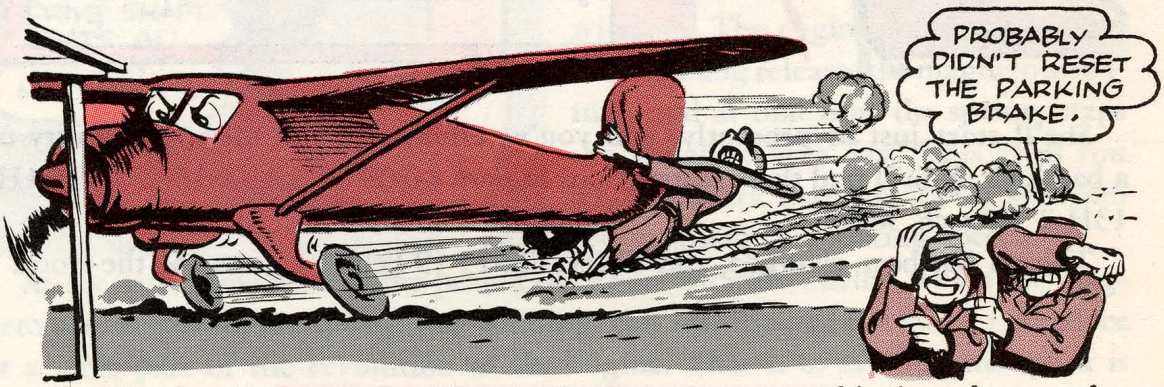
Seems some of the boys have been havin' trouble with sand in the hooks jammin' the micro-switches. So, if rough air gives a momentary no-load condition, the load leaves you. They tell me the boys don't like to take delivery on their jeeps fifty feet in the air.

So why not give your hooks a real careful checkout and cleaning—then do everything you can to prevent draggin' 'em through sandy ground.

BETTER BEAVER BRAKE VALVE

Friends, Romans and Beaver trappers, lend me your ears:

It seems a small goof has resulted in Scott parking brake valves in the 4200-series getting back into supply channels in an unmodified condition. Which



means they could be on your Beaver (L-20) now, or could be issued to you for a replacement.

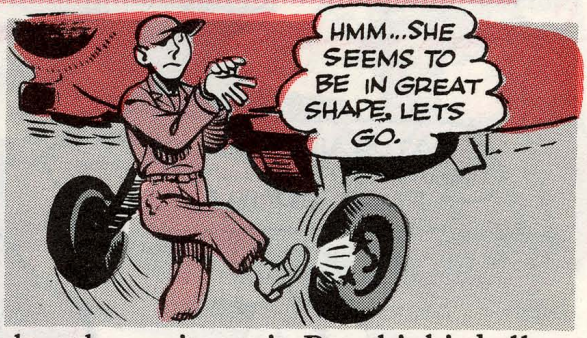
OK, this valve does work. But the trouble is, when it's in park position (closed) you can't increase brake pressure, no matter how hard you kick the brake pedals.

So, first of all, check and see if your aircraft has these 4200-series valves in her. If so, best you requisition the new valves, FSN 1560-629-4536 (P/N 4500 SA1) and install 'em.

And in the meantime spread the word around so that you and your pilots and anybody else authorized to start or taxi Beavers get in the habit of always releasing and re-setting the brakes before starting the engine.

None of which relieves you of the obligation to have chocks under your wheels any time the aircraft's engine is running except when you actually intend to move it.

DON'T LET YOUR GUARD DOWN!



It was **most** embarassing: Real proficient pilot, with over 85 landings a week for the last seven weeks, all carrying passengers in the Beaver. So he gets a solo flight, bounces into his tried and true old work horse and wild-blue-yonders her.

He had a whole 100 feet of altitude when the engine quit. Bent his bird all up on the landing.

So now he's trying to explain **why** he didn't check the gasoline before he took off, and the boss man isn't smiling.

No matter how much time you have, and no matter how dependable your aircraft is, you never never never reach the point where you can afford to kick the tire and light the fire, even once.

ONE DID, ONE DIDN'T— ONE IS, ONE ISN'T

Shoulder harnesses for the birds? Perhaps so, and for the **birdmen** too! Believe it.

Two recent accidents are the case in point. In one of them an L-19 had an engine failure at too low an altitude for safe jumping. It was flown into some 50-ft trees and totally destroyed. The pilot and his passenger were properly belted **and harnessed** in place, and were only scratched.

While in the other case a man was found dead in a crashed helicopter—and his shoulder harness was **not** in use. There was every indication that had it been, he could have walked away from the wreck.

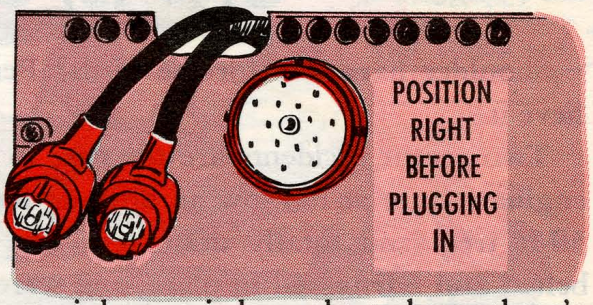
Simple, isn't it: Them what used the harness lived—him what didn't use it died.

The Right Position

You've all heard the old routine about position being everything in life.

Maybe the man who made up that little saying didn't quite realize it, but his words of wisdom were maybe more true about plugs than about people.

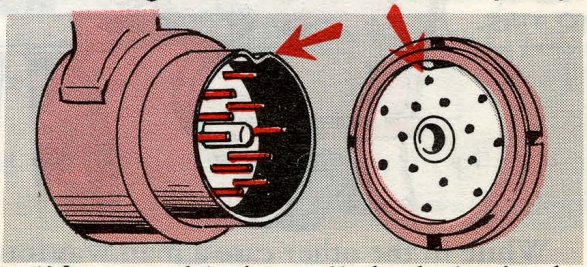
Because a plug that isn't positioned right when it's time to shove it in sure is going to leave an operator with a bent pin—or more. And if he hasn't got a pin straightener handy—well, that's the end of things as far as that plug and receptacle are concerned.



As a matter of fact, even though a pin straightener is brought to bear, there's a chance something will go wrong. Figure it this way: the pins on an 18- or 24-pin connector are not the strongest things in the world.

As a matter of fact, once they're bent there's a good chance that they'll break as soon as somebody starts straightening or messing around with them in any way. They just aren't made to flex and bend.

So position properly. When it's time to stick a plug into a receptacle, check where the ridge is on the plug—and then line it up with the matching slot in the receptacle.

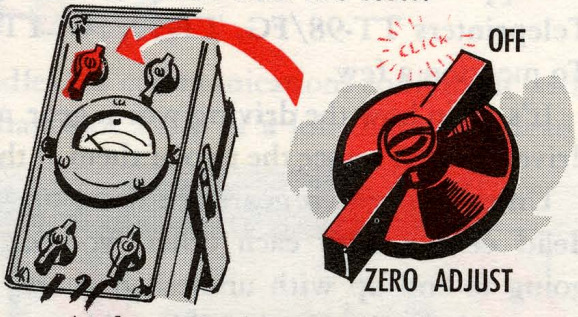


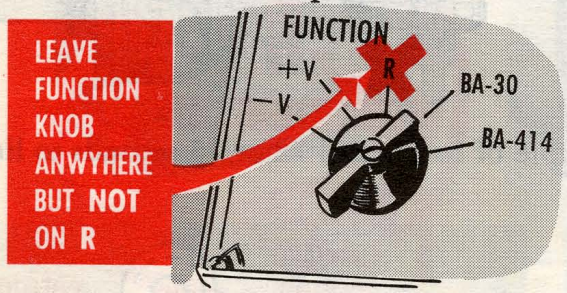
That way all the pins on the plug will slide smoothly into all the holes in the receptacle. Any other way and you run a dangerous risk of knocking out a plug—which could mean knocking out the whole electronic rig.

Testy Subject

Naturally you're in a hurry to wrap things up . . . get the bench cleared . . . and head for the gate. Fine. Who doesn't. But why not make two last checks on that AN/PRM-15 Multimeter. Takes only seconds, but it could make the big difference next time you open up the case and want to make with the tests.

When you turn off the ZERO ADJUST knob, be sure it is **OFF.** Best way to do that is to turn 'er all the way—clockwise—'till you feel and hear a soft click. **Then** it's OFF. Besides, it's impossible to put the cover in place unless that knob is in the OFF position.





And comes time to slip the cover on, y'might bear one small but kind of important item in mind. Drop your eyeballs toward the lower left corner of the front panel. The setting of that FUNCTION KNOB should **not** be at R. Any other one. But not R. H'yars why:

There's a good chance that when the test leads are wrapped up and tucked into place—and the cover clamped on—one of the prongs might touch the metal cover. Pretty hard to avoid, as a matter of fact. And it's OK as long as the FUNCTION switch is not on R.

But if so—if that switch is on R—and if a prong touches the metal cover—then a circuit is completed. Ouch! And that will drain the life out of the batteries faster than anybody wants to think about.

This kind of PM will mean a lot to your multimeter, and pay dividends for everybody right on down the line.

When the Worm (Gear) Turns

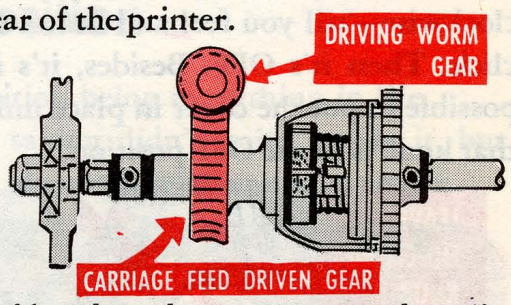
So that's what's been happening, eh!

The printer in your Teletypewriter Set has been jumpin' a little. Maybe not spacing right. A little whip-lash effect. Some lines look sort of ragged, with too much space between some characters and and others squeezed together.

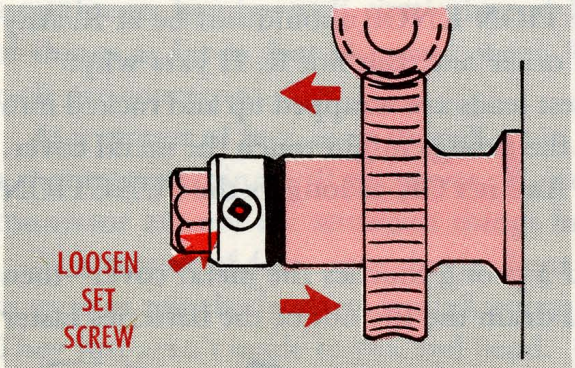
Happens on the AN/FGC-20 and AN/FGC-25 Teletypewriter Sets—on their Teleprinters TT-98/FG, TT-99/FG, TT-100/FG, TT-117/FG and TT-119/FG. To mention a few.

It's all in how the driving worm gear makes with the mesh on the carriage feed driven gear. You see the two of them at the rear of the printer.

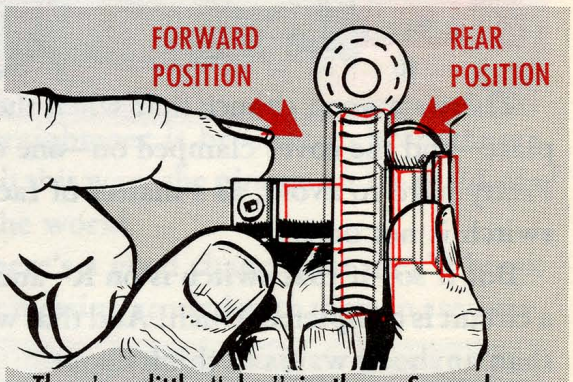
Unless those two gears are lined up **dead center** with each other, you're going to end up with unmeshed gears . . . rapid wear . . . and visible evidence on the paper of what happens when those gears don't get together right.



All a repairman needs is maybe a couple of hands and 12 or 15 seconds to line 'em up.



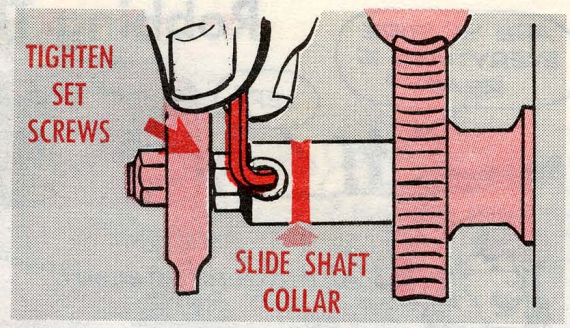
Loosen the set screws in the shaft collar. Then use a push-pull routine on the carriage feed driven gear. First push it forward until it's tight. Then pull it to the rear until it's tight.



There's a little "play" in there. Somewhere around 1/8-in. The idea is to center the carriage feed driven gear at midpoint between the forward position and the rear position.

Things get a little eye-straining about now, so sort of remember that the distance between the back face of the carriage feed driven gear and the machined surface of the base casting is about 1⅛ inch. But that distance will vary maybe three or four cat hairs from one printer to another.

Line the gears up—and when they're lookin' each other square in the eye—hold the carriage feed driven gear in place and slide the shaft collar against it. And tighten the collar set screws.

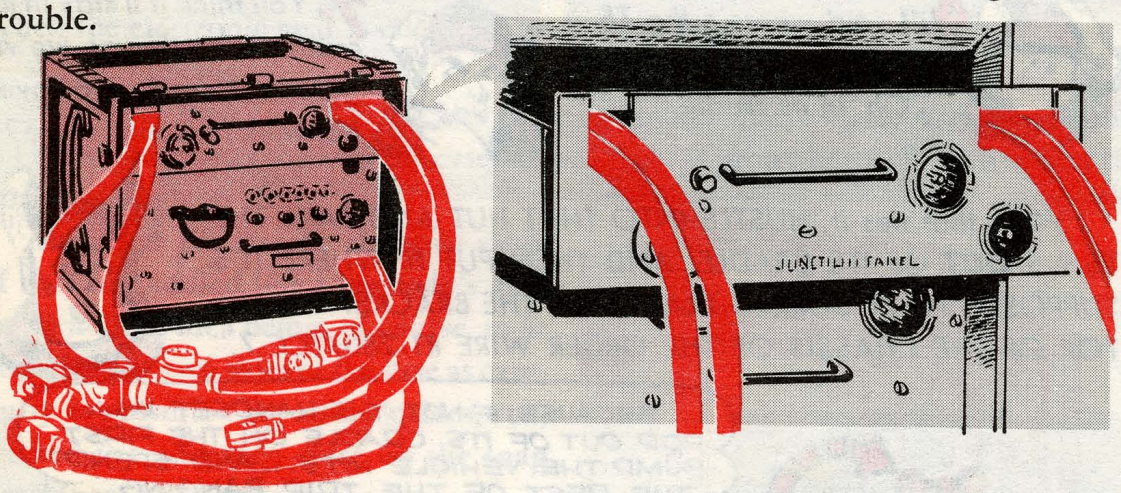


Wrap things up by checking two related adjustments—like mentioned in the TM. One on the carriage feed shaft ratchet wheel and the other on the carriage feed shaft drive shaft collar.

And your spacing problems are squared away.

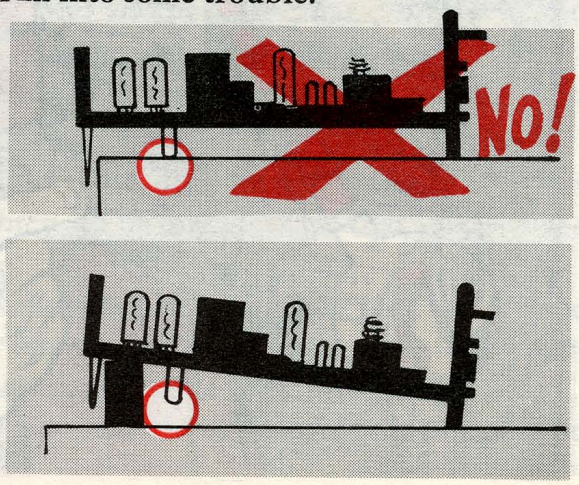
Lay It Gently

Even though a good repairman handles his communications equipment with a firm, gentle touch, there's always a chance of a slip or a jolt that might lead to trouble.



Like when you slide out the Junction Panel of the Amplifier-Pilot Regulator AM-707/TCC-7 on your AN/TCC-7. Sliding it out is no sweat, but settin' it down on the bench or floor is when you might run into some trouble.

So happens that the E-105 insulator on the bottom of the Junction Panel sticks down a trifle too far for comfort—or safety. It extends just about as far as the supporting pins. And that means it's not protected when the panel is laid down on a flat surface.



A little care, then, when handling the panel. Either prop it up so the insulator clears the bench, or lean it firmly against a support to keep the insulator in shape.

Robbing The Cradle

1. "All drawers fastened?"
"Yep."

2. "All switches off?"
"Yep."

3. "Awright, where's the TS-9-5 Handset?"
"Huh?"

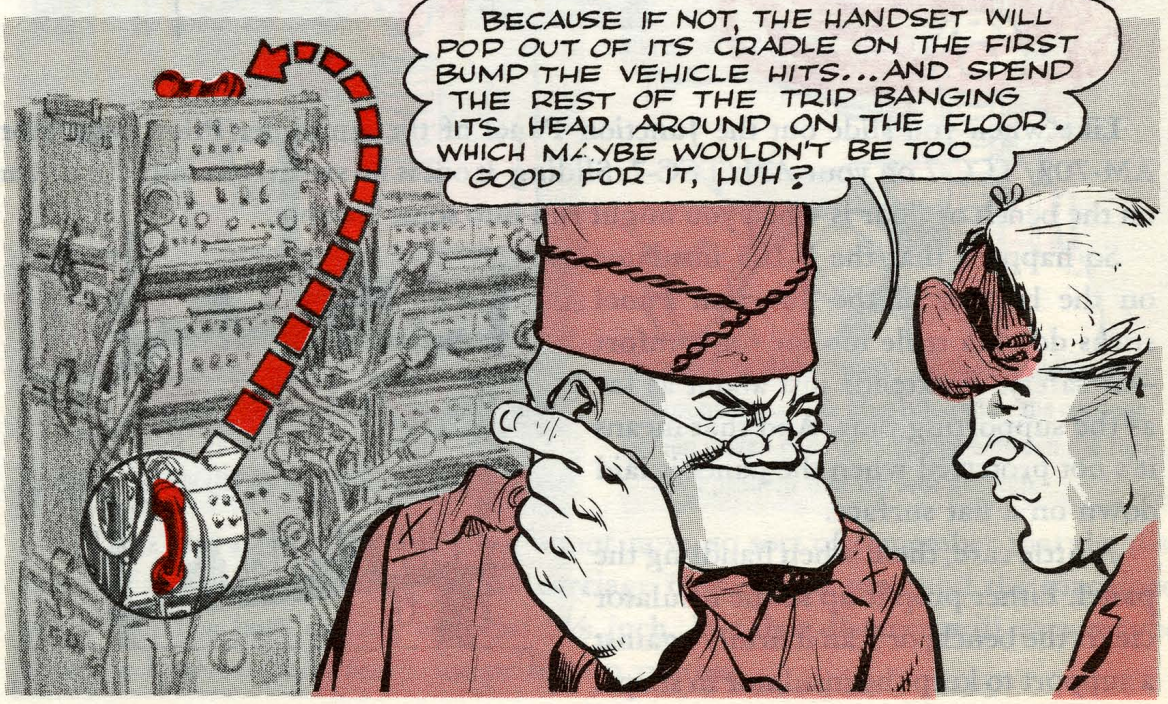
4. "I said where's the TS 9-5 Handset?"
"Oh. In its cradle."

5. "Where?"
"In its cradle on the group panel of the AM-707/TCC-7."

6. "WHERE?"
"Like I said. In its cradle on the group panel."

7. "You think it'll stay in its cradle even though we've got rough country to cover between here and there?"
"Yep."

"Well, that ties it. HUSTLE INTO THAT HUT AND TAKE THE TS-9-5 **OUT** OF ITS CRADLE. AND THEN PUT IT WHERE IT'S SUPPOSED TO BE DURING TRAVEL—IN THE BRACKET ON THE TOP OF THE CHASSIS OF THE ORDER WIRE RT-280/TCC-7."



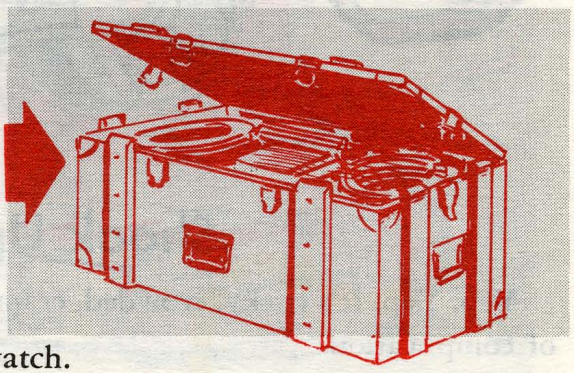
Snap It Right

So how complicated can a snap catch get?

The kind used on all those different cases used in packing up Signal equipments. They're either snapped shut when the cases are closed—or they're snapped open when the electronic gear is taken out and put to work.

All simple enough.

But here's the catch. Those cases close up tighter than a clam. And the pressure on the snap catches to keep the cases closed tight is pretty fierce. Which makes life rough enough on them.



And their life can be chopped short if they're handled like somebody's mad at them. The idea being, of course, to fit together the two sides of the case as carefully as possible (get all the cables, etc., tucked in) and then close up the snap catch firm and fairly fast.

Comes now a special kind of thing to watch.

And that is: there are two kinds of snap catches. One kind that can be fixed by your own outfit if it breaks or pulls loose. And another kind that can be replaced only by sending the case outside the unit. All the way back to the shop.

It's all in how those snap catches are attached to the side of the cases—either by a screw (easy to fix) or a couple of rivets (not so easy to fix).

For example: the snap catches on the Transmitter Case CY-1341/TRC are screwed into place. Easy enough to tighten up or even replace that screw if the snap catch starts to show signs of shifting.

But the snap catches on the Antenna Reflector Case CY-1385/TRC are riveted in place. And if they work loose or break off—the case has to go out into the organization and back to the shop for a new snap catch—or catches. Not good.

So you might check your cases. See what kind of snap catches they have. And treat them all with care.

Real Good and Often

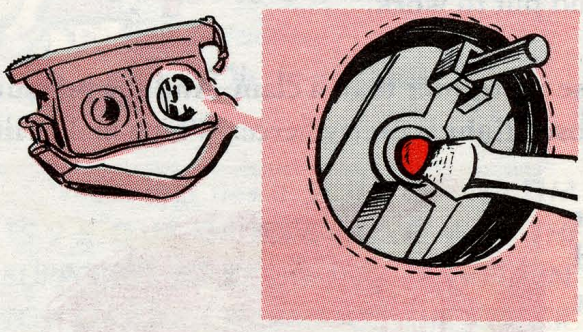
See that there handwheel retaining screw?

The one that holds the handwheel on the TA-43 and TA-312/PT telephones? It needs a little screwing.

How many messages is the man up forward—or up anywhere—going to be able to send if he can't crank his phone? Mighty embarrassing when he goes to ring up somebody and CLUNK . . . the whole assembly flops into his sweaty mitt.

All because the retaining screw didn't retain.

It's one of those things a man can't tell just by looking at it—like you can tell a cracked case, corroded battery or frayed cord by a quick visual check.



Before heading for the field, then, do yourself and your outfit a good turn by taking a few turns with a screwdriver on that retaining screw. A few seconds of screwing will pay off later in hours of good ringing operations.

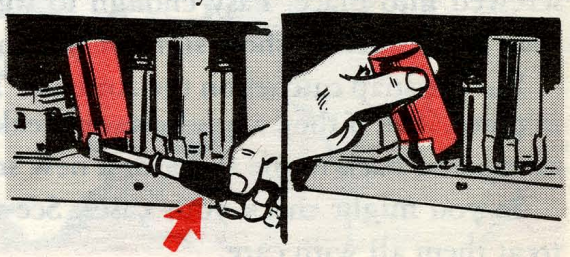
Shook Up Vibrators

Yep, Yep. It's tricky, crowded, cramped and generally a curse-inspirin' kettle of complications.

And any Sig repairman who has ever had to shake loose the vibrators (E1, E2, E3) in a PP-109/GR or PP-112/GR Power Supply sometimes gets the twitch just thinkin' about the task.

One thing's for sure. There's just not enough finger space inside the chassis of those power supplies to do a neat pluck job, especially because you need a good upward lift.

So the shrewd bench jockeys slip a screwdriver—very careful like—twixt vibrator and socket. And a gentle pry is all it will need to free the vibrator from its socket.



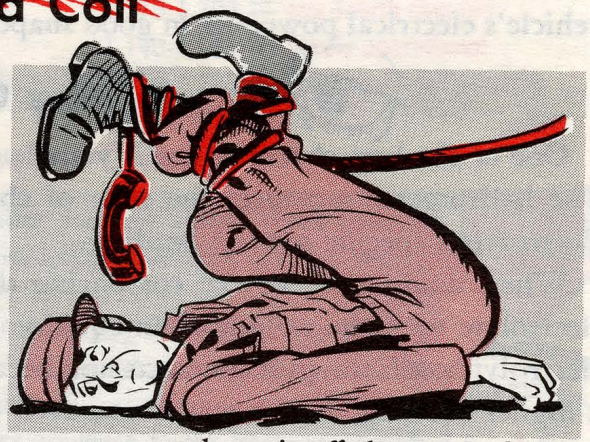
When it's free enough for freedom, just tilt it toward the side of the unit and lift 'er free.

Felt Need

Sometimes the old work bench can be sort of hard when a repairman sets down a radio chassis or a few tubes or almost any electronic gear. Hard enough, s 'matter of fact, to damage some of the more delicate equipment.

Some simple scrounging should set a repairman up with a good sized piece of felt to put right there on his work bench. That felt will smooth the job . . . make things a bit quieter . . . and even look a shade better.

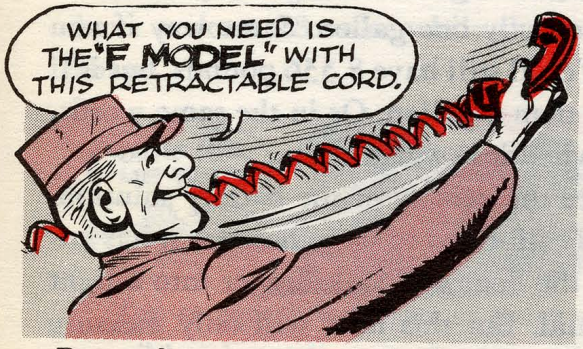
Coiled Coil



It's awful easy to get an ankle or foot or something snarled in the cord of that handy Handset H-33/PT.

It hangs down and curls around and generally gets in the way—unless you back off a full five feet from your radio gear. Not likely.

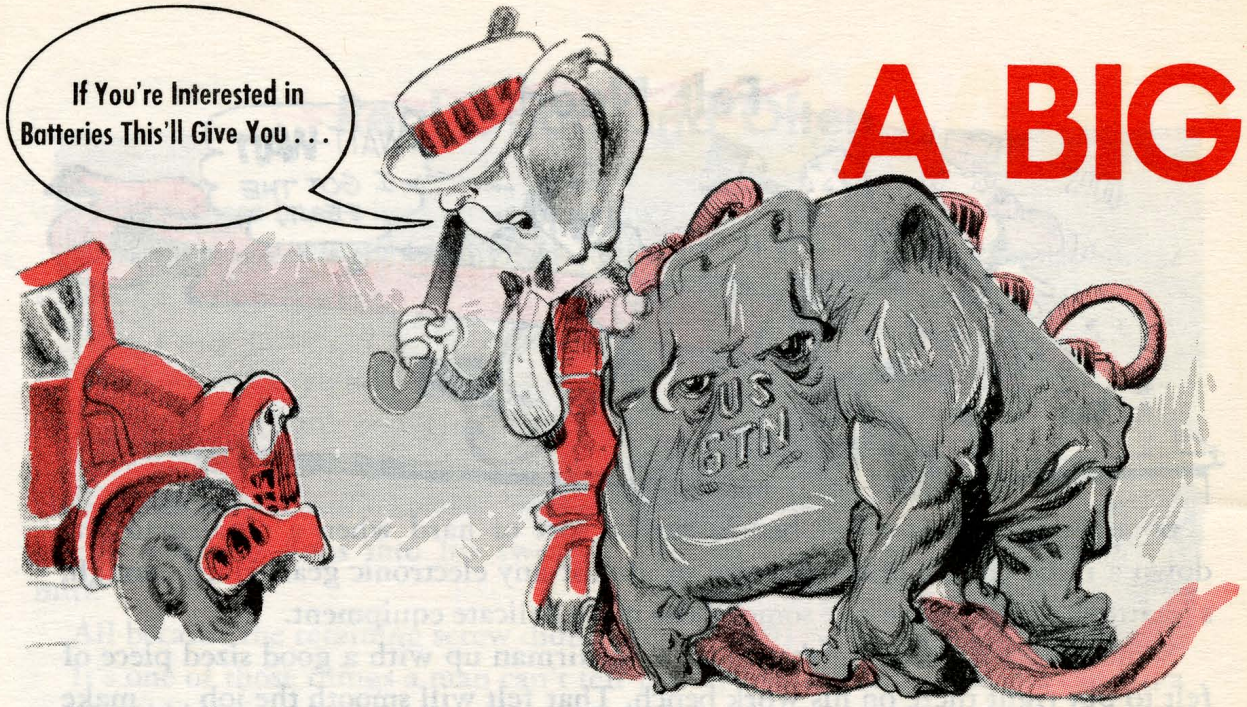
Now y'might say there're two ways out of the dilemma. For one thing, try looping the cord over any nearby hook or support to keep it off the ground. Or, better still, (if your handset is ready for replacement) send out a signal for the new type now in supply.



New type cord did the man say? What else! A handy, practical, curled kind. The kind that stretches out as far as you need and then curls up accordian-style so's to stay out of the way when the phone talk is finished.

The same kind you find on most civilian-type telephones.

But make sure you requisition the "F" model of the H-33. It's the only one with the retractable cord. And they're available in supply now, too.



You can do everything just right with your tracked or wheeled vehicle—lube it, operate it just so, fill out all the forms and keep it as clean as a baby that's just been powdered. But, brother, you go no place unless the battery—the source of all your vehicle's electrical power—is in good shape.

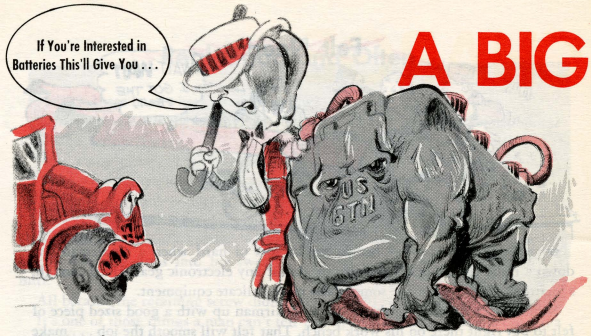
Battery Check

One of the best checks to see if your battery is working is with a hydrometer. The hydrometer measures the state of charge your battery is in by giving the electrolyte's specific gravity reading.

When doing this, you're comparing the weight of an exact volume of your electrolyte with the weight of an equal volume of water. Like water, when your electrolyte cools down it contracts and becomes dense. So a cold solution will give a higher reading than a warm one even though the actual percentage of acid remains the same.

You see, 8.336 pounds of water equal one gallon at 62° F. If you cool off that jug of water down to almost freezing, it'll still weigh 8.336. But the water contracts with the cold and it'll no longer be exactly one gallon. Same way if you heat it up to just below the boiling point. You'll still have 8.336 pounds, but it'll have expanded until you have a little more than a gallon. Or in the same words, water becomes denser as it cools—thinner when it is warmed up.

Your hydrometer uses a float to measure the density of the battery solution. The float is weighted to hold it vertical and calibrated to show how far it has settled into the liquid you're testing. Natch, the float will sink deeper into a light liquid and rides higher out of a dense liquid. But this float will only measure the actual density of the solution without taking into account the temperature variations that make the electrolyte contract or expand.



A BIG CHARGE

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Your Corrected Hydrometer

To correct your reading, the rule is: Subtract 4 points for every 10° below 80° F, and add 4 for every 10° above. That's because your hydrometer is built to give you a true specific gravity reading at 80° F only.

Let's say your battery electrolyte is 60° F and the float says it has a specific gravity of 1.240. Since 60° F is two 10's below 80° you're going to subtract two 4's or eight points—which leaves you with a corrected reading 1.232. So if you look at the specific gravity chart you'll be able to tell the condition of your battery.

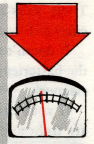
1.240
— 8
1.232

What Specific Gravity Means

1.265-1.290 = fully charged battery
1.235-1.260 = three-fourths charged
1.205-1.230 = one-half charged
1.170-1.200 = one-fourth charged
1.140-1.165 = barely operational
1.110-1.135 = completely discharged

Voltmeter Check

There's nothing like being sure—especially when your low voltage circuit tester is handy. This'll not only check out your batteries but your vehicle's charging system as well. To check out the batteries use your low voltage circuit tester set at 50 volts. Hook its positive lead to the positive post of the battery that has the starter cable attached to it. Then, hook the negative lead of the tester to the negative post of the battery that has the ground wire attached. That way you're sure to get the kee-rect measurement. 'Cause if the negative lead was grounded to the frame, a possible voltage drop could give you the wrong reading.



Leave your ignition switch OFF, and crank your engine with the starter. If you have at least 18 volts while the starter is cranking, your batteries are in good shape.

Matching Batteries

Try to match batteries in pairs so that they are as nearly equal in voltage as possible—depending on the amount of batteries you have on hand. The closer the voltages are . . . the more evenly matched the batteries will be.

CHARGE

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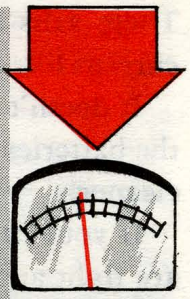

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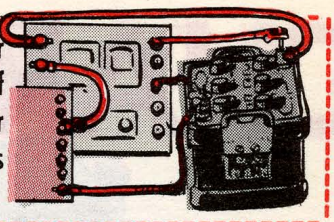
Test each battery with your low voltage circuit tester. Hook up the tester so you'll draw current from the battery through the load bank. Draw half the rated capacity of the battery—50 amps for the 6TN's and 22½ for the 2HN's—for about 30 seconds. This'll allow for any small differences and let the battery output be even.



Then read the voltage—which'll be lower than the batteries no-load voltage.

For example, supposing you check out four batteries and the scoreboard reads:

NO. 1—11.27 VOLTS
NO. 2—11 VOLTS
NO. 3—11.80 VOLTS
NO. 4—A LITTLE OVER 11 VOLTS

If it's your idea to match No. 1 and No. 3 and your second choice is No. 2 and No. 4—you win the big, black cigar. Pair 'em off this way and you're almost sure to get more life out of your batteries.

Let's Keep It Clean

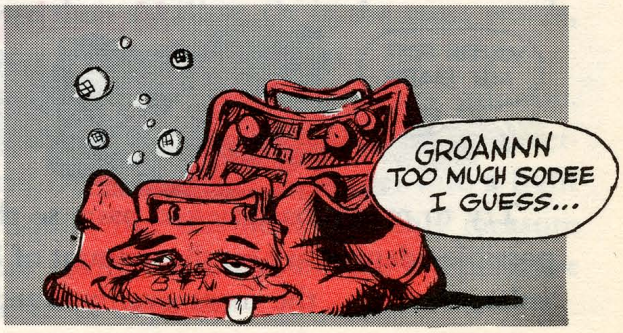
Things start happening with the battery if it isn't kept clean. Here are some signs of a dirty battery and what to do about it:

1. Electrolyte salts—this results from acid fumes given off through the vents or from spilled or overflowed battery acid.

When any acid liquid is left to dry or wiped off it leaves these electrolyte salts. These salts in turn will pick up moisture and in this combination they drain current like a sneak thief in a deserted bank.

It doesn't take too much to stop this. First, when you wash your vehicle, hose the batteries and carriers with lots of clean water. Never, but never, use a steam cleaner.

If your carriers and battery are dirty, get 'em out, make sure the battery caps are tight and give everything a good scrub down with a scrub brush and a solution of baking soda and water—one pound of soda in two gallons of water is plenty for a half-dozen vehicles. (FSN 6810-264-6618, Soda Bicarbonate, Technical: will get you a 1-lb carton.) Let the soda solution sit on the battery until all the foaming stops, rinse it off with clean water and try again. When there's no more foaming you've neutralized all the acid on the battery and the carriers. Rinse once more with fresh water and let dry.

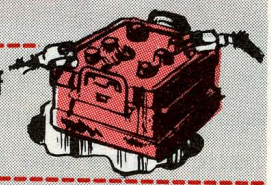


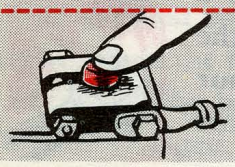
Remember, if the caps aren't tight—the soda can get into the battery and neutralize acid just as fast inside the battery as well as outside.

2. Cable terminals—As long as you've got the soda handy, clean the cable terminals and dunk them, too. Then rinse in fresh water. If you haven't any soda at the moment, you can get by using lots of fresh water.

3. Paint the carriers—Any type of paint is better than leaving the bare metal of the carrier exposed, but acid-resistant paint is better than any other paint. FSN 8030-290-5141, Compound, bituminous, solvent type is available from the Engineers.

4. Check the case—While you got it out, eyeball for leaks, cracks, signs of chafing and anything else that look suspicious.





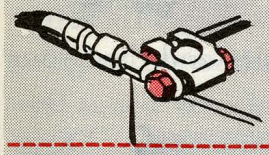
5. Grease 'em—Remember to put a light coat of grease on the battery posts and the cable terminals **after** they've connected. Now don't think that if a light coat is good a heavy coat of grease is even better. Not so—just use a sm-e-ear.

6. Make sure the terminals are tightly fastened. Metal handles should be fastened tight to the case, clean and slicked down with GAA.

Words of Caution

Here's what to be on the lookout for and what not to do if you're working around batteries:

1. Check your battery cable insulation—is it frayed or worn? A bare cable can cause a short circuit or a fire.



2. Tighten just right—The connection at the battery post, that is. But be careful in the other direction, too. You don't want to overtighten 'em either 'cause this will crack the lugs.

3. Starting a fire—And that's exactly what you can do when you light a match or flash a spark near a battery. Here's why: Hydrogen gas (which is highly flammable) is given off by the battery when it's being charged or discharged. And you got some gas floating around all the time even when the battery's not working.

4. Avoid "bulgitis"—A battery can develop this disease if the voltage regulator is set too high. 'Cause as the generator keeps putting out, the batteries overcharge and heat up. So check your TM for your vehicle's correct regulator setting.

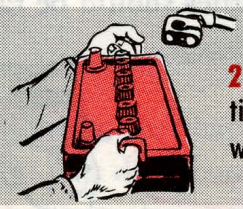
Another thing that'll put a drape shape on your battery is running the battery when its electrolyte level is below the top of the plates. The plates will corrode and swell—and buckle. Then, letting the specific gravity run down in freezing

temperature can also distort the case. Clogged up vents in the battery caps will cause pressure to build up inside and sooner or later the battery gives up the ghost.

5. Never keep a battery that reads more than 25 points between cells.

Operational Tips

1. Removal—To take out your battery, first turn off all circuits and then disconnect the ground cable. If you're not sure all circuits are off, ventilate the battery area and disconnect the ground cable at the frame. If a spark does occur it'll be at least a cable length away from the battery. Now, if you should happen to touch the vehicle with your wrench when you unhook the positive cable you won't get a short circuit and the possibility of a burn.

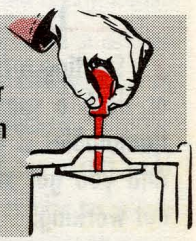


2. Installing—When you set the battery into the vehicle, position it so the negative post lines should line up with the negative cable. If you're in doubt, as to what leads to what, check your vehicle's TM for the right hook-up.

Then, tighten the hold-down bolts. Make darn sure that these bolts are just right. Not too tight so you strip the threads but tight enough so's the battery is held firm. If you tighten the hold-down bolts too much you can also cause a cracked or distorted battery. This'll cause leaks where the sealing is broken.

Okay, so now the first cable you hook up is your positive cable—and then your negative cable.

3. Adding water—By using the syringe you'll be able to judge just how much water to add—not too much and not too little—just enough to come up to the design (broken line) in the battery well in all military batteries. If there's no indicator in the cell, fill to ¾-inch over the plates.



Be Careful

If you get acid on your clothes—you can't do much except change 'em and dunk 'em in some soda solution to stop the acid action. If you get any acid on your body—wash yourself with mucho water and report to a doctor. Your shop probably has an

eye-washing fountain or a jug of soda solution. Learn their location in case you have to help yourself or a buddy.

When working around batteries it's always a good idea to wear rubber gloves and battery aprons.

Don't mess around . . . if your battery is leaking, get a new one.

BATTERY WORKER'S APRON, FSN 8415-234-9253

RUBBER GLOVES, FSN 8415-266-8705

Cold Weather Whammies

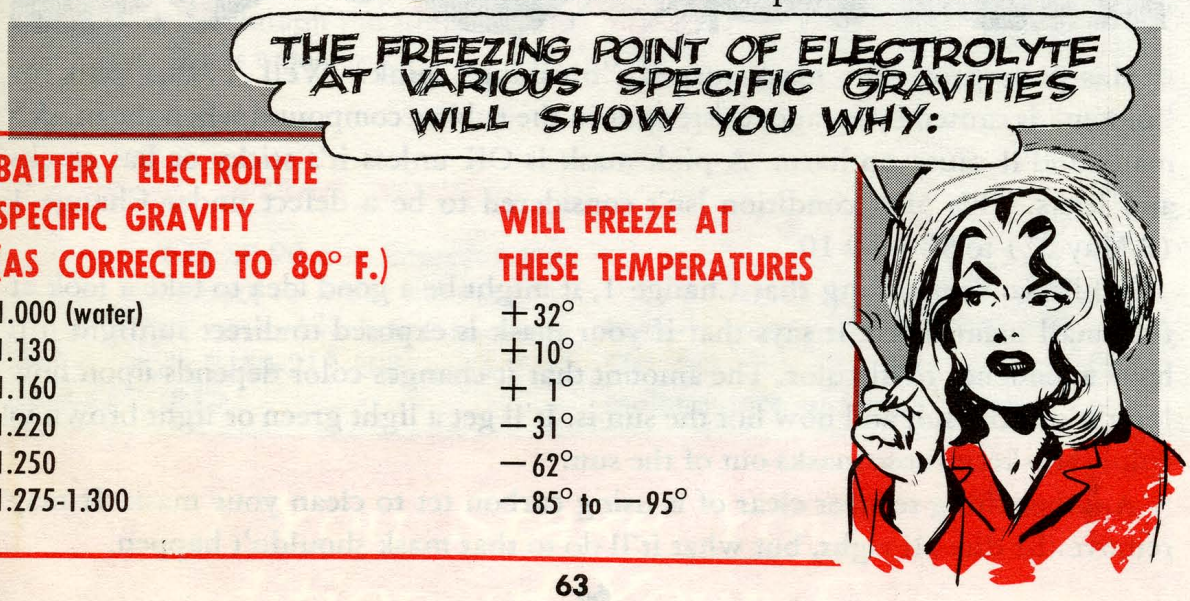
The greatest enemy to your battery is cold weather . . . so you got to be extra careful when the frigid season hits.

O'course, the best way to protect your battery from freezing is to make sure it's fully charged. And you want to do that by checking it as many times as you get a chance without interfering with your mission.

Supposin' you can't start your vehicle or can't get a long, long ride after a cold start. Take your batteries into a warm joint or put 'em on charge. Otherwise, they'll freeze up on you.

Also, the colder the battery gets, the less charge you can get out of it. So there's another reason you might want to get the battery out of the vehicle on a cold, cold night. A warm battery has a much better chance of starting. If this can't be done: Try warming the battery before starting your vehicle. But never do this near an open flame or never get it hotter than you can put your hand to it. TB ORD 390 (18 Jul 52), including Change 1 (20 Jan 54), tells you how to use the M40 slave kit to heat your batteries.

But all this business doesn't have to be done unless the outside temperature is going to be well below zero. A battery that has been taken care of will start a well-tuned vehicle down to 10° below zero without special treatment.



BATTERY ELECTROLYTE SPECIFIC GRAVITY (AS CORRECTED TO 80° F.)	WILL FREEZE AT THESE TEMPERATURES
1.000 (water)	+32°
1.130	+10°
1.160	+ 1°
1.220	−31°
1.250	−62°
1.275-1.300	−85° to −95°

As you can see the temperature would have to go so low that a brass monkey would be in severe pain before your battery would freeze when it's fully charged.

Don't go adding water to the battery in cold weather unless you're going for a long run 'cause the water will freeze in the battery.

But that doesn't mean old Jack Frost doesn't take his due. Even with a fully charged battery at zero degrees you only get about 40 per cent of the cranking power you'd get from the same battery at 80° F. The battery current, as you know, comes from a chemical reaction and the cold slows down that reaction—and there isn't a dadblasted thing you can do about it.

An extra handicap is that your engine at zero degrees needs about 2½ times more cranking force than it does at 80° F. So you only get 16 per cent of the cranking power on a zero degree day compared to the normal amount on an 80° day.

The same barrier that makes it harder to get power out of the battery makes it just as hard to get a charge into the battery—so take the battery to a warm shop for this kind of operation.

BLOOMIN' MASK

Has your protective mask turned "blushing" pink? Well . . . this pink or "bloom" is caused by an age resister put in the rubber compound when the mask's made and'll cause no harm. A pink mask is OK unless it's sticky or has cracks and leaks. This pink condition isn't considered to be a defect under Change 1 (2 May 57) to SB 3-30-10.

While you're reading that Change 1, it might be a good idea to take a look at the small print there. It says that if your mask is exposed to direct sunlight it'll have a tendency to discolor. The amount that it changes color depends upon how long it's in the sun and how hot the sun is. It'll get a light green or light brown in color. So—keep those masks out of the sun.

Another thing to steer clear of is using carbon tet to clean your mask. It may remove the dirt all right, but what it'll do to that mask shouldn't happen.

Connie Rodd's BRIEFS

Not attractive

Any time you have to clean the magnetron in your radar set, steer clear of steel wool. The magnet part of the maggie will draw the slivers of steel wool... and when they stick to the insulating parts, you just won't have any insulation. Use crocus cloth instead. And if cleansing powder will work, you can use that.

The volt's the thing

Caution... watch it... think. You've read where you can stick a higher-rated fuse in the place of a lower-rated one as long as the amperage is the same. That's right. But don't put a lower-rated voltage fuse where a higher-rated one belongs—even though the amperage is the same. Fire is catching.

Sorry, wrong number

If your M56 SP 90-mm Scorpion mechanics are about to order the Nozzle, Fuel Injector, assembly listed on page 17 of TM 9-2350-213-20P... use FSN 2910-571-6769.

Gotta nylon raincoat?

Hey, there! You with the new nylon taupe 179 raincoat! That coat wasn't designed for fatigue or field duty, so you've gotta be mighty careful with it. You wear it with your Class A uniform or appropriate civies only. Carrying it around under your belt, for example, can punch holes in it. You'll use either the synthetic rubber, shade 107 raincoat, or a poncho in the field. DA Circular 670-37 (7 July 59) gives you the real lowdown.

Keep the spring

The magazine spring which is a part of the ten-round magazine used on the M40A1 Recoilless Spotting Rifle M8 is in short supply. So when you have an unserviceable magazine assembly better hang on to the spring FSN 5340-726-6418, so you can repair other magazines.

It's in the TB

What every good Nike outfit ought to have: a copy of TB-9-1400-601-20 (24 Oct 58). The TB gives a rundown on maintenance of interconnecting cables.

Would You Stake Your Life on the Condition of Your Equipment?

ROLL OUT THE RED CARPET FOR A V.I.P.*

*VERY IMPORTANT PUBLICATION

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